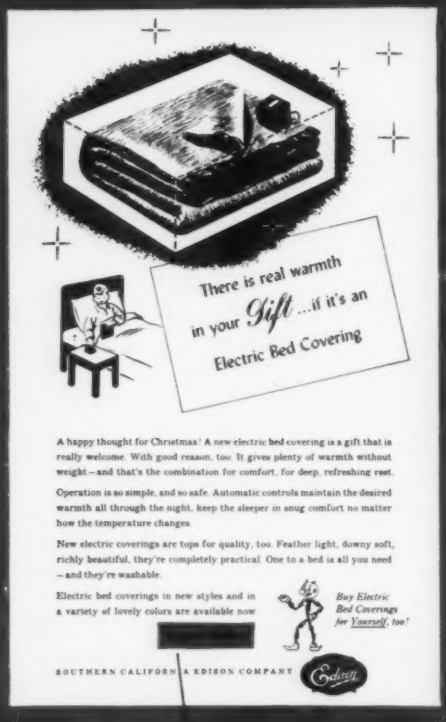
ELECTRICAL WEST

February 1948
25 cents

29th Annual Review and Forecast, Page 65
Appliance Sales Guide, Page 111

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.


There is real warmth
in your Gift ...if it's an
Electric Bed Covering
A happy thought for Christmas! A new electric bed covering is a gift that is really welcome. With good reason, too. It gives plenty of warmth without weight – and that's the combination for comfort, for deep, refreshing rest.
Operation is so simple, and so safe. Automatic controls maintain the desired warmth all through the night, keep the sleeper in snug comfort no matter how the temperature changes.
New electric coverings are tops for quality, too. Feather light, downy soft, richly beautiful, they're completely practical. One to a bed is all you need – and they're washable.
Electric bed coverings in new styles and in a variety of lovely colors are available now
Buy Electric Bed Coverings for Yourself, too!
SOUTHERN CALIFORNIA EDISON COMPANY
Edison

Get Perfect Rest! Awake Refreshed!
with an ELECTRIC Bed Covering!
There's no more perfect combination than warmth without weight for sleep that is really relaxing! That's what you get when you sleep beneath a modern electric covering. One is all you need.
No tossing and turning because of bulky covers. No need for "extras" if the room gets colder. Your electric bed covering keeps you snug and comfortable, ignores room temperature changes. You merely set the degree of warmth you desire on the bedside dial, and automatic controls maintain it all through the night. Modern electric coverings are soft, easy to operate, and completely practical. They're beautiful, too—colorful and richly napped. Get them now, for perfect rest at every season.
Edison
SOUTHERN CALIFORNIA EDISON COMPANY

Certified
-right for Christmas
HERE'S A WORD OF ADVICE about selecting the lamps which figure in your Christmas plans. To decorate your home, or to give as gifts, choose lamps which bear the "Certified" tag.
"Certified" lamps are built to exacting specifications of safety, construction and performance. They combine new concepts of beauty and styling with improved lighting efficiency. Their modern design gives 50% more light where you need it, directly on the reading surface. So the orange and blue tag on the base and shade is your assurance of lamp quality, of the light that is right for the home.
Your dealer has "Certified" lamps in a wide variety of styles. There is one for every lighting need.
Edison

a certified lamp
makes a Gift
that is right
If you've written "lamp" after some of the names on your list for Christmas giving, you'll want to be certain of getting the best. So specify "Certified" lamps when you buy.
You'll be giving better light, with a new design that throws 50% more light on the reading surface, where it's needed. You'll be giving a lamp that's attractive, too, styled with a modern, up-to-date beauty.
To be sure it's a "Certified" lamp, look for the orange and blue tag on base and shade. It signifies that the lamp measures up to high standards of electrical safety, mechanical construction and lighting performance.
"Certified" lamps are available for every room, and for every lighting need. See them
Here's what to look for in the new, all new Certified Lamps
SOUTHERN CALIFORNIA EDISON COMPANY
Edison

AT YOUR DEALER

very truly yours,

SOUTHERN CALIFORNIA Edison

Southern California Edison Company

GENERAL ELECTRIC REPORTS ON COMPLETE SEALING TO PROLONG OIL LIFE

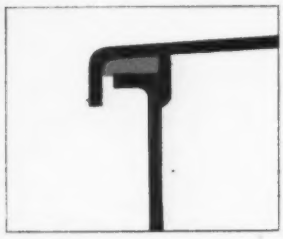
Sealed tanks, long a feature of G-E power transformers, are now used in Spirakore distribution transformers to prevent moisture from contaminating the oil.

Every opening in the Spirakore sealed-tank transformer—cover, handhole, and bushings—is sealed with a Buna-N rubber gasket. No cement or sticker is used. Compression of the rubber within a confining area forms an air-tight seal—without affecting accessibility.

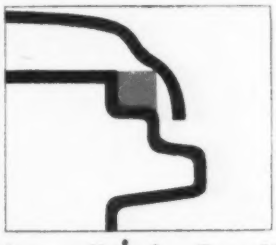
This complete sealing should not be confused with splashproof construction. Splashproof transformers are gasketed to prevent oil leakage during shipment and handling, but are not air-tight—they do breathe, and in breathing draw in moisture-laden air.

Spirakore sealed-tank transformers *do not breathe.* Their Buna-N rubber gaskets—unharmed by oil, by age, or by operating temperatures—keep atmospheric air, moisture and other contamination out.

The sealed-tank construction in G-E pole-type distribution transformers is described in new bulletin, GEA-4885. For your copy, write to Apparatus Department, General Electric Co., Schenectady 5, N.Y.



On large tanks, Buna-N rubber gasket of circular cross-section is compressed as shown. A ring welded to the tank keeps the gasket in place and prevents too much compression.



On small tanks, Buna-N rubber gasket of square cross-section is compressed between rim of cover and deep-rolled flange on tank. Shown uncompressed.

Spirakore Transformers

GENERAL ELECTRIC

402-72

Reproduced from poor material

FEBRUARY 1948

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents Copyright. Sixtieth year of publication.

ELECTRICAL WEST

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IN THE WORKS

Preparations for the March and April numbers are under way and promise valuable and interesting reading. For the engineer there will be an installation account of the first single side band AM carrier system in the West, on Pacific Power & Light lines between Portland and Pasco. Also a pictorial presentation of pulling up the conductors on PG and E's new 380-ft. towers to cross the Sacramento River. For contractors there will be an interesting theater lighting control system for a small school auditorium that offers ideas for the many school enlargements now contemplated. Also another of the foremen's forum topics started in the last two issues. For the sales-minded there will be an account of what refurnishing school homemaking departments means to the industry in the future. Reports to bring out the significances will be made to you of the San Diego Bureau of Radio & Electrical Appliances conference, the spring market of the Western Merchandise Mart, and the first convention of the new Idaho State Electrical Contractors Assn. And remember that the April issue this year will come in two sections, one the year-round reference book, the Manufacturers' Directory of Western Repair Parts and Service Stations.

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The West Still Builds 65

Highlights of electric utility operations in the Far Western States; comparisons of Western with the national operations.

1947—Building for New Loads—1948 68

Construction record for 1947; scheduled plant additions for year 1948, as reported by utility management of the West.

1947—This Electrical Business—1948 92

Western utilization men report on merchandising policies, on kilowatt-hour sales, market saturation and probable demand.

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Cover photo: Uprighting world's largest transformer at Snohomish substation of Bonneville Power Administration (Westinghouse photo).

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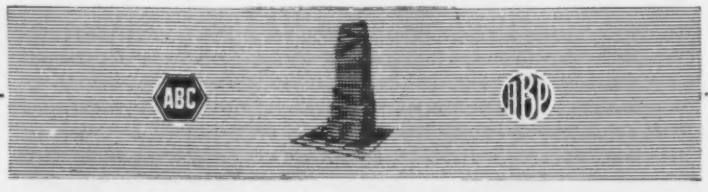

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These L-M Power Fuse Cutouts

handle 7.5 to 46 Kv. . . . 100 and 200 ampere ratings

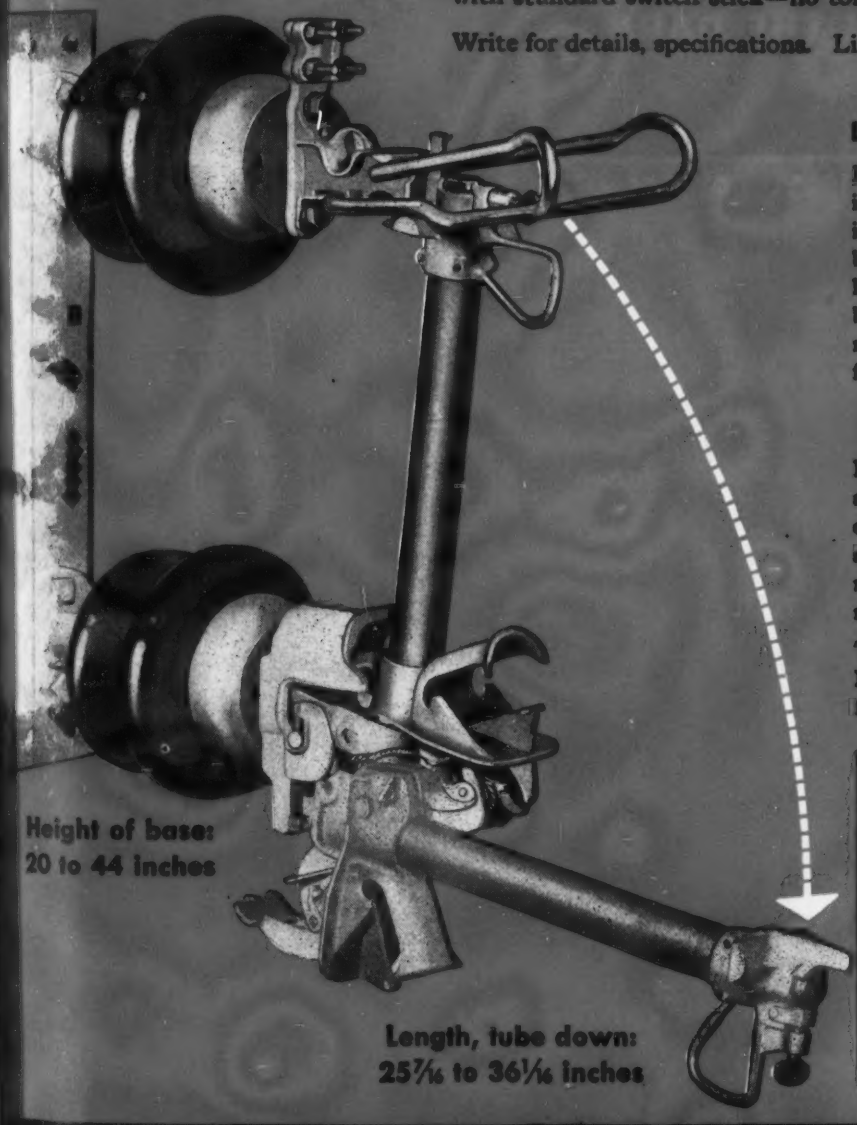
with interrupting capacities up to 6000 amperes

For heavy currents at or near substations . . . for transmission lines . . . wherever high voltage, high rupturing capacity cutouts are required.

A fuse cutout using standard field replaceable fuse links. Upper and lower venting. Simple, positive operation. Link flip-out release double lower hinge. No excessive strain on link. Unique wire spring contact design provides firm contact, free floating action with positive latch at top of tube. No shunts or other current transfer means. For re-fusing, cartridge can be lifted off hinge with standard switch stick—no tongs or special sticks needed.

Write for details, specifications. Line Material Company, Milwaukee 1, Wis.

Length, tube up:
20¾ to 31½ inches



Height of base:
20 to 44 inches

Length, tube down:
25⅞ to 36⅛ inches

L-M Replaceable Power Fuse Links

Field replaceable standard links similar in design and construction to types used in distribution cutouts. No cartridge to buy, no filler tubes to bother with. Links have tin fusible element; strain wire; butt-soldered to top button and lower rod terminal. Long fibre tube housing from button to flexible leader.

Cutaway view of 200 ampere link

Double-Venting Feature

Button closes top of cutout tube. Side spring contacts permit button to blow off under heavy shorts, releasing pressure at both ends of tube. Eliminates recoil and stresses on contacts and mountings.

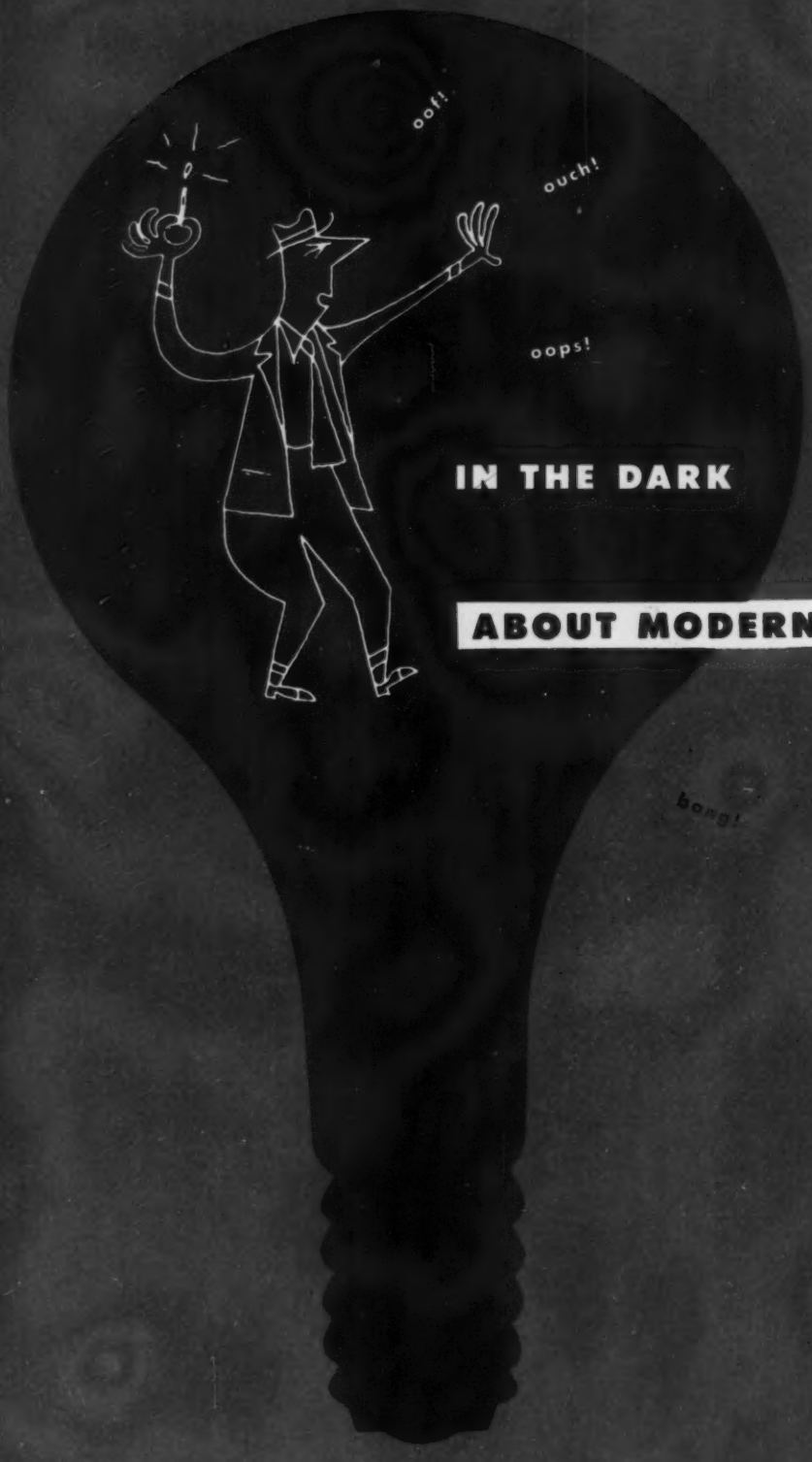
Time current characteristics conform to NEMA "E" standard SG-11 for power fuse links.

RUPTURING CAPACITIES		
Voltage	Type HFO 100-amp rating	Type HXO 200-amp rating
7500 volts	4000 amps	6000 amps
15000	4000	6000
23000	4000	6000
34500	2000	4000
46000	2000	4000

LINE MATERIAL

FUSE CUTOUTS & FUSE LINKS

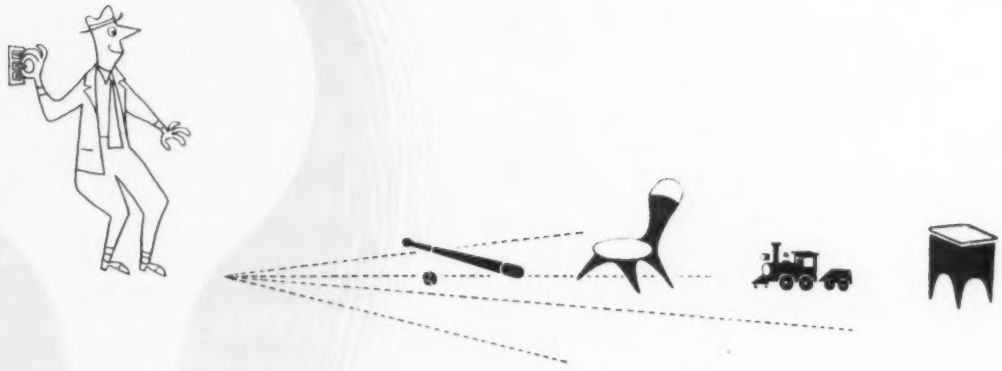
L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • Wired Radio Control Equipment • Capacitors



crash!

ABOUT MODERN LIGHTING CONTROL?

bang!



SAFLEX CONTROL SYSTEM LIGHTS THE PATH AHEAD

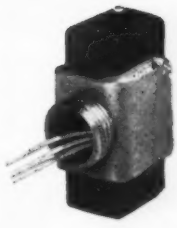
The Saflex lighting control system—at no additional cost—makes it possible to provide the home owner with more convenient and more flexible control of lighting.

Because the Saflex system operates on 24 volts, A.C., it eliminates the necessity of installing electric metallic tubing to the control switches. Since it is a multiple system utilizing three wire control it eliminates the use of 3 way or 4 way switches. It is, therefore, economically practical to install light control points at every entrance to every room.

The system is readily adaptable to a remote or master control system.

The Saflex control switches are 24 volt, A.C., single pole, double throw, automatic center position return, lever type.

The Saflex Relay is delivered complete with mounting bracket and is installed in the fixture outlet box or in the receptacle box. Control wires can be extended to any number of control points at a minimum of cost.

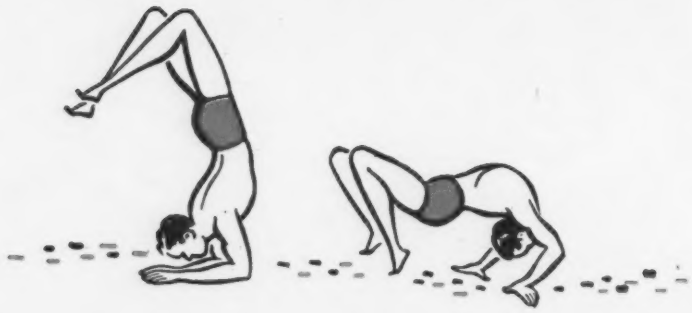


APPROVED BY UNDERWRITERS LABORATORIES

SQUARE D COMPANY

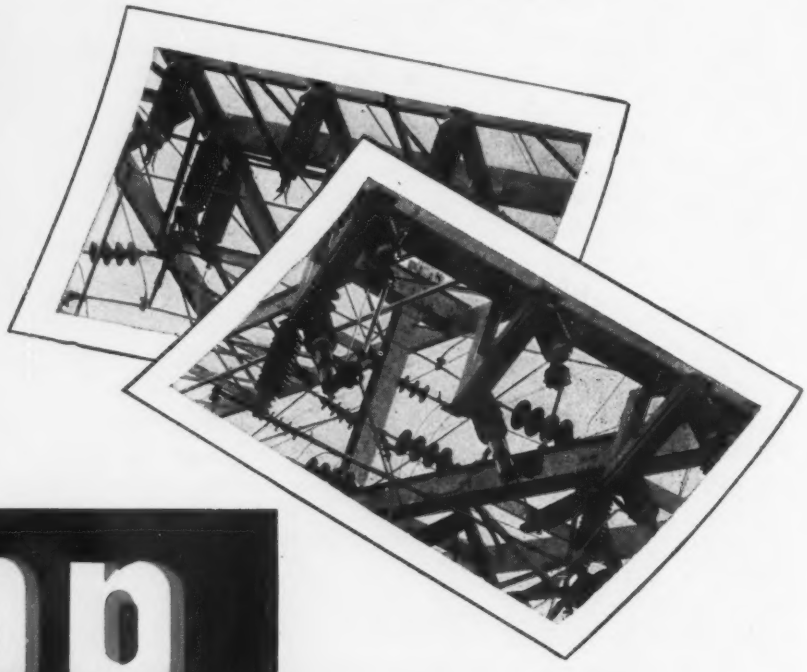
DETROIT · MILWAUKEE · LOS ANGELES

SQUARE D CANADA, LTD., TORONTO, ONTARIO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.



IN ANY POSITION

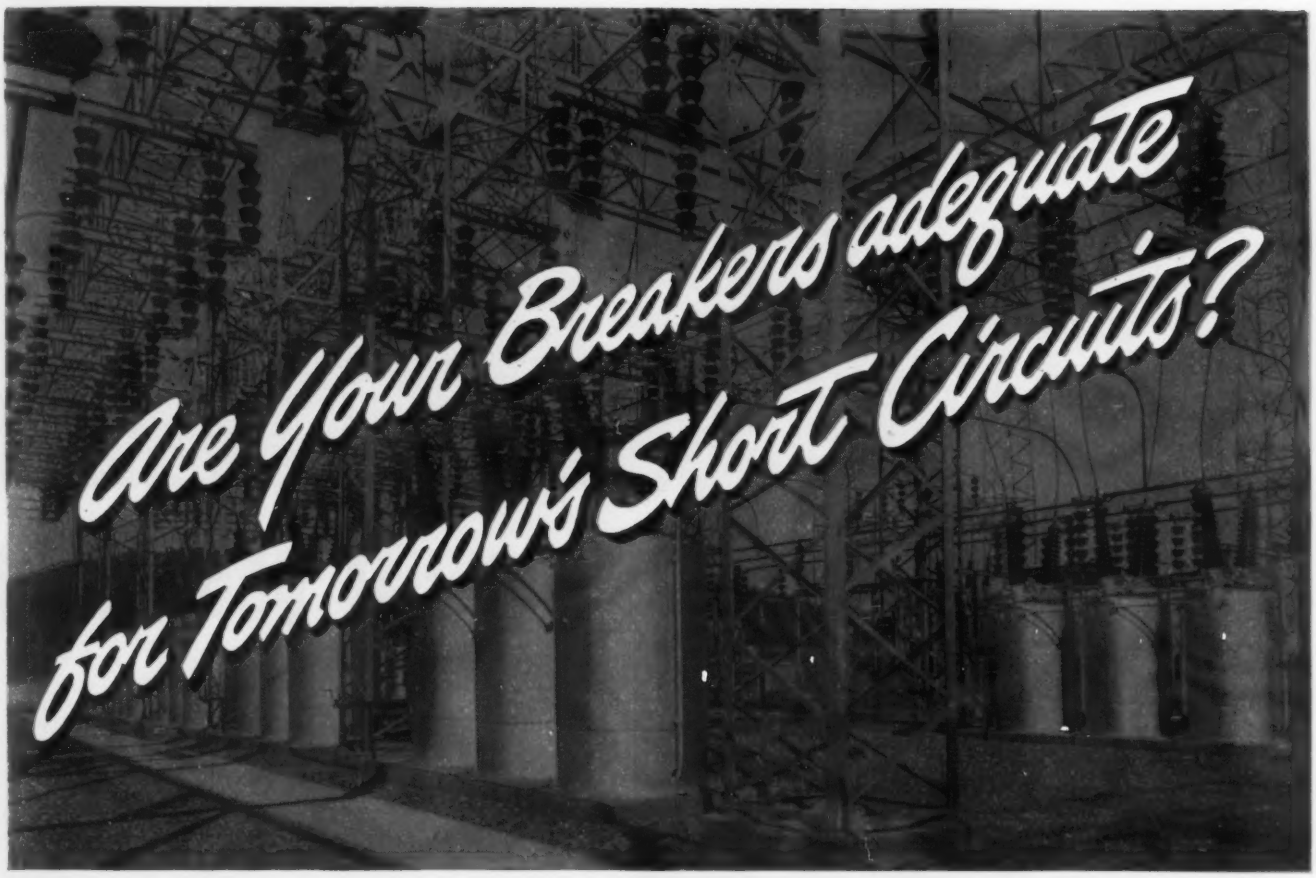
Upright, underhung, angle—in any position design feasibility indicates—Lapp Station Posts have the same rigidity and impact resistance, the same high mechanical and electrical characteristics. There's only one porcelain part to a Station Post, a sturdy post, with hardware externally attached. No high intensity loading, no nested porcelain parts, no pin. A clean mechanical and electrical design—with a clean operating record.



Lapp

STATION POSTS

LAPP INSULATOR CO., INC. • LE ROY, N.Y., U. S. A.



In the next three years, 15,000,000 kw will be added to American generating systems!

The nation's central stations—faced with a swiftly growing demand for electrical power—are setting new records in power generation. The situation poses numerous problems. Increases in generating capacity . . . in feeder and distribution lines . . . and new interconnections with other systems are only a few. And one that can't be overlooked is that of maintaining adequate breaker interrupting capacity.

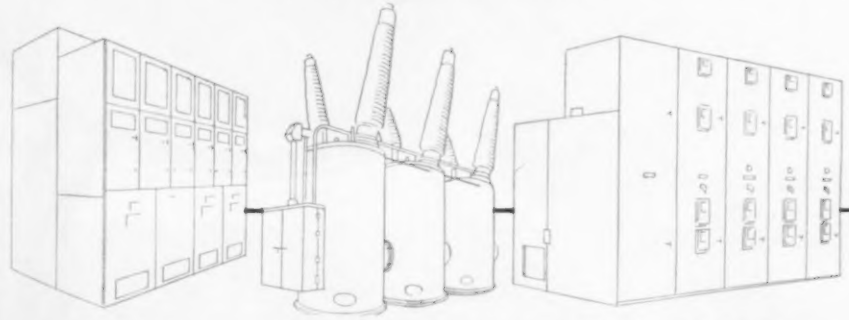
This applies to both outdoor and indoor breakers . . . wherever power on the system has grown to the point where short-circuit stresses may exceed breaker capacity. For only by keeping breaker capacity in step with system expansion can your investment in generating and transmission facilities be protected.

It is wise, also, to look beyond present-day requirements . . . to the time when generating capacity will have grown enormously. Here, Westinghouse is prepared to help . . . in some cases, by boosting the interrupting rating of your present breakers . . . or in developing a planned schedule of replacement to meet today's and tomorrow's peaks.

Just call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60657

Westinghouse POWER CIRCUIT BREAKERS

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE



Cubicle Switchgear
Int. Cap. 2,500,000 kva

GM Oil Circuit Breakers
Int. Cap. up to 10,000,000 kva

Heavy-Duty Metal-Clad Switchgear
Int. Cap. 500,000 kva

Made in the WEST for the WEST

DRAG IT OVER ROCKS

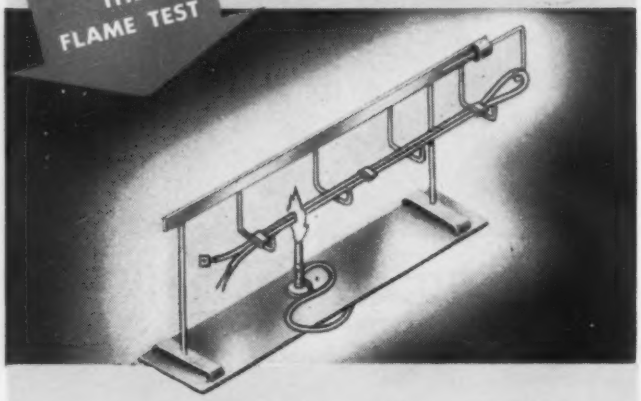
Its Neoprene "rubber armor" is as tough as truck tires . . . will stand years of scuffing and scraping. Type PS Shielding with conducting rubber tape plus ground wires assures utmost safety and maximum electrical endurance.

SOAK IT IN ACID MINE WATER

Synthetic Neoprene was engineered to resist corrosive acids, alkalis, oil and grease . . . and especially the destructive conditions found in most mines.

GIVE IT THE FLAME TEST

U·S·S Amerclad is approved by the State of Pennsylvania under the new flame resisting regulations.

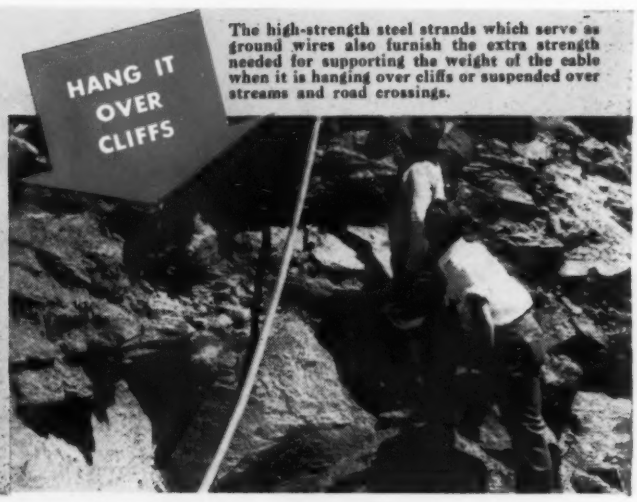


If your cable

WRITE FOR BOOKLET

Whatever the job, you can do it better with Amerclad Portable Power Cables. They're obtainable for low or high voltages, in every needed size and type. Write for our booklet, "Amerclad Cords and Cables." It will save you time and money.

RUN OVER IT WITH HEAVY EQUIPMENT
Accidents do happen and this tough, resilient cable is engineered to stand the rugged service of strip mining or any other outside construction work.


HANG IT OVER CLIFFS
The high-strength steel strands which serve as ground wires also furnish the extra strength needed for supporting the weight of the cable when it is hanging over cliffs or suspended over streams and road crossings.

must take punishment like this . . .

AMERCLAD GPS

IS THE CABLE YOU NEED

How PS Shielding improves worker safety

PS Shielding with conducting rubber tape is a development originated by American Steel & Wire Company engineers. It has been so successful in improving the safety of electrical cables that many other cable makers have been licensed to use this type of construction.

Type GPS Shovel Cables are made up of three flexible conductors separately insulated and separately covered with *conducting* fabric tape. When the three conductors are cabled together, three bare ground wires are laid up, one in each interstice of the insulated conductors. The assembly is completed with rubber fillers, seine cord and a heavy Neoprene jacket.

Short circuit tests were made by driving spikes and metal objects through the conducting tape into the conductor without touching the ground wire. These faults invariably tripped the overload breaker showing that PS Shielding is truly an effective safety measure.

The conclusion is that you can use these cheaper, lighter, and smaller GPS Shielded Cables without sacrifice of the safety features of the full metallic shielded Type SH Amerclad Shovel Cables.

AMERICAN STEEL & WIRE COMPANY
AMERICAN ELECTRICAL WIRE AND CABLE
UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
Tennessee Coal, Iron & Railroad Company, Birmingham, *Southern Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

U·S·S AMERCLAD CABLE

Practical tools for Practical men!

POWERS CIRCUIT ANALYZER

1 2 3 4
POWERS
CIRCUIT ANALYZER
TELLS YOU
If circuit is hot.
Whether 110 220-440-550.
Whether it is A.C. or D.C
Whether it is STAR or DELTA connected
TESTS for FEED BACK OR GROUNDED CIRCUIT. Read the Instruction Sheet for Operation.

CATALOG NO. 101

Takes the Guesswork out of your work. It tells you what kind of circuit you are working on. Tells you whether its A.C. or D.C. Whether its 110, 220, 440, or 550. Tells you what the circuit is STAR or DELTA connected and whether grounded DELTA or insulated DELTA. You can make any test with this instrument that can be made with any other voltage tester but it has a WIDER RANGE than any other Voltage Tester known. List price with Leather Case 24.50. List price without Case 14.40.

POWERS VOLTESTER

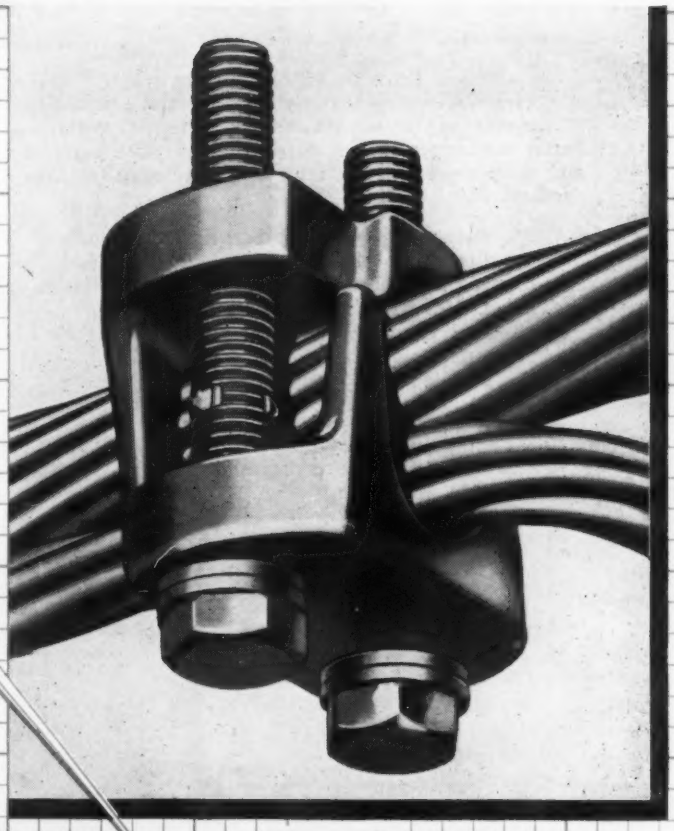
Is a practical tool for ordinary voltage testing. It is equipped with a six-watt Mazda lamp which will tell positively at a glance whether the circuit is hot and how hot. You should know if you are working on 110, 220, 440, or 550 volts. A POWERS VOLTESTER tell instantly by the brilliancy of its own light what voltage you are on. List price with Case 6.60. Without Case 5.20.

CATALOG NO. E 112

POWERS PRODUCTS ARE SOLD ONLY THROUGH DISTRIBUTORS . . . If your dealer does not have these products write to

POWERS MANUFACTURING COMPANY

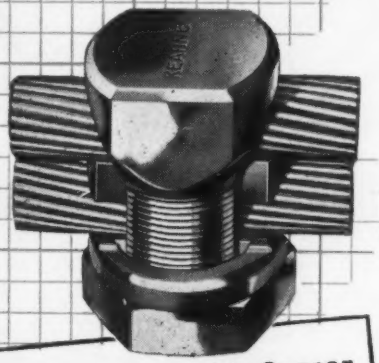
1527 FOLSOM STREET • SAN FRANCISCO 3, CALIFORNIA



Use this

Kearney PRESSURITE Two-Bolt Clamp

for Connections in Highly Corrosive Atmospheres and Get Better Performance at Less Cost



Con-Nec-Tite with Spacer

Spacers for stranded conductors available in sizes from 2 stranded thru one thousand MCM.

Connections made in corrosive atmospheres require high pressures capable of breaking through the corrosive film on conductors. This is particularly necessary in cables of greater than seven strands where the inner strands cannot be cleaned mechanically.

The Pressurite Clamp has two high strength, fine pitch, threaded bolts that exert equalized high pressures on large size stranded cables.

Use them for the tough assignments where contaminated air and high short circuit values put heavy demands on connectors. Sizes 4/0 through 1000 MCM.

—o—

All Kearney Con-Nec-Tites in sizes #8 through #4/0 are now made from the new specific connector material, tough, high conductivity Kearnalloy, made to match post war improvements in power line construction.

Always Specify **KEARNEY PRODUCTS** *For the Job*

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE

THERE'S DOLLAR-FOR-DOLLAR VALUE

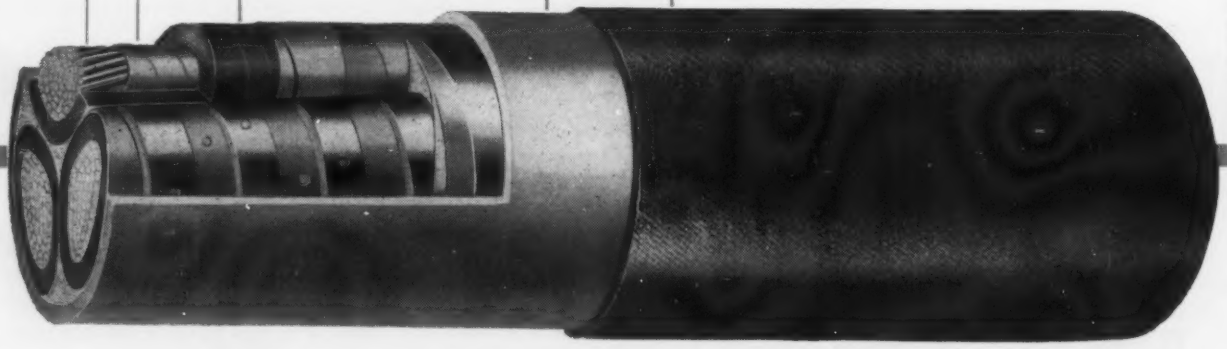
Copper conductors electrolytically cleaned. No foreign matter to impair insulation's dielectric qualities. Sector conductors are so shaped that no plane surfaces and sharp angles prevent snug fit of insulating tapes on conductor.

Metallized paper tape, between conductor and insulation, keeps out objectionable products of reactions between copper and oil. Provides smooth conducting surface under insulation. Also wrapped over insulation, metallized tape maintains electrical contact with metal shielding tape or lead sheath, preventing ionization when sheath expands.

Oil-impregnated insulation possesses high stability. Power factor measurements made at intervals on sealed lengths of this cable kept in oven maintained at 100°C show that even after four years of severe exposure there is no appreciable deterioration of the insulation.

Stabilized Lead Sheath — Okonite-Callender's sodium treatment removes impurities in the original lead, prevents others from developing during sheath-forming. Welds are strong. Sheath thickness uniformity controlled through use of electronic concentricity gauge.

Okosheath Protective Covering — a durable corrosion-resistant covering that may be added where lead requires protection from chemical attack. Also insulates lead sheath against electrolytic corrosion.



IN $TEP-BY-$TEP PROTECTION

Present-day work-costs demand thinking that goes far into the future. In making a choice of paper insulated power cables, avoidance of future maintenance and replacement burdens is no less important than installation costs. So Okonite-Callender is the considered choice of many executives and engineers in utilities and electrical departments who place prime importance upon the service records and operating economy of a cable.

Okonite-Callender maintains a continuing research program to find the best materials and learn how best to use them. Okonite-Callender engineers are always ready to discuss with you specific advantages of various cables of the solid, oil-filled and gas pressure types and of the Oilostatic Transmission System . . . to help you decide which offers the best year-after-year value in paper insulated power cables. The Okonite Company, Passaic, N. J.

6274

OKONITE CALLENDER

solid type . . . Oilostatic . . . gas pressure . . . oil filled paper insulated power cables

Allis-Chalmers Improved Network Transformers

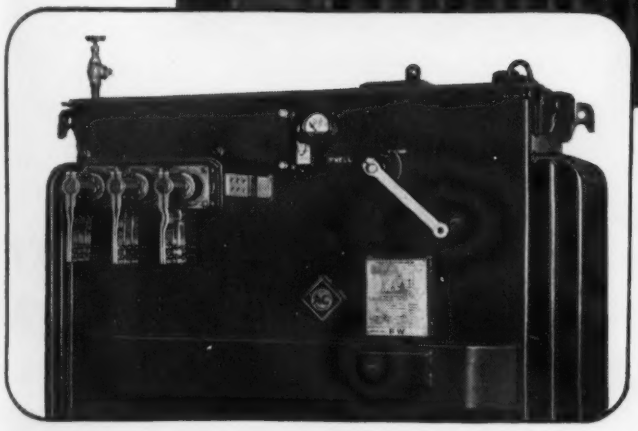
Meet System Needs of U.S. Cities!

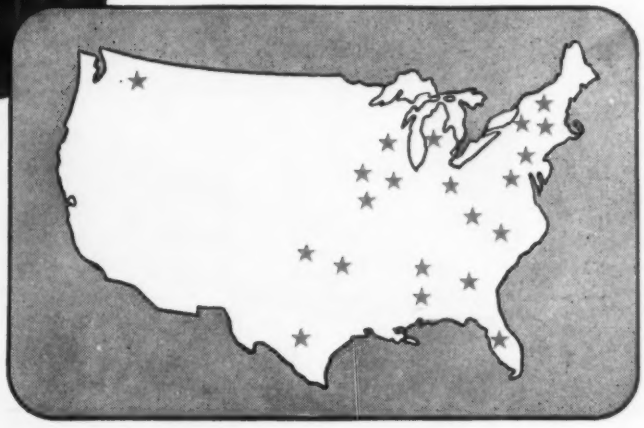
★ SMALLER SIZE, YET *NO* CUT IN RUGGED DESIGN!

★ L. V. THROAT FITS ANY *STANDARD* NETWORK PROTECTOR!

★ SUBWAY OR VAULT TYPE!

1 **YES, THESE MODERN, IMPROVED** transformers can be designed to meet *your* specifications—for size, electrical characteristics, accessories. And while they're smaller in overall size, there has been no reduction in the rugged mechanical and electrical characteristics typical of this transformer class.





2 **THERMAL CAPACITIES ARE HIGH . . .** operation is cool — even under the most severe load conditions. Allis-Chalmers' *time-proven* circular core and coil design withstands repeated heavy short circuit stresses. Universal low voltage throats permit you to "team" network protector of *your* choice with transformer you select.

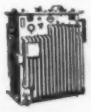
3 **IN NEW YORK, ILLINOIS,** Alabama, Arkansas, Texas — from east coast to west — over ½ million kva of Allis-Chalmers network transformers are in service . . . operating *continuously* and *dependably*, supplying economical, uniform power to home, business and industry. For the *full* story see ALLIS-CHALMERS, MILWAUKEE. A 2296

TRANSFORMERS ALLIS-CHALMERS BUILDS:

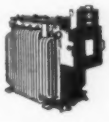
POWER — 500 kva to largest. Dry-type or liquid-filled.

⅛% STEP REGULATORS — single phase 2.4 to 15 kv; 3-phase 2.4 to 69 kv.

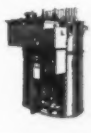
DISTRIBUTION — 1½ to 500 kva. Pole, vault, subway, substation and dry-types.



LOAD CENTER—100 to 2000 kva. Dry or liquid-filled. Indoor or outdoor.



NETWORK—150 to 1000 kva. Vault or subway types.



FURNACE — Indoor or outdoor. Water or self-cooled. All ratings.

INSTRUMENT — potential, current, and signal, indoor and outdoor types; outdoor metering. Standard voltages.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

Speed up vital Construction with

Reliable

STRAIGHTLINE SPLICES and DEAD ENDS

Available for Immediate Delivery

Illustrations Actual Size For No. 4 Solid Copper Wire

Furnished in Sizes from No. 8 Strand to 250 MCM Copper

Summary of RELIABLE PRODUCTS

- Split Bolt Connectors—for Copper Wires
- Special Plated Connectors—for Aluminum, Plated or Steel Wires
- Service Entrance Connectors, Flip-on Tap Clamps, Ground Rod Clamps and Solderless Lugs
- Straightline Splices and Dead Ends for Distribution and Transmission Lines
- Splicing Sleeves for Overhead and Underground Construction
- Cable Pulling Grips, Steel or Bronze
- Cable Hangers, Zinc or Copper
- Telephone Protectors, Cable Terminals, Outside Plant Specialties

Reliable ELECTRIC COMPANY

3145 CARROLL AVENUE
CHICAGO 12

OVER 40 YEARS *Service* TO THE UTILITIES

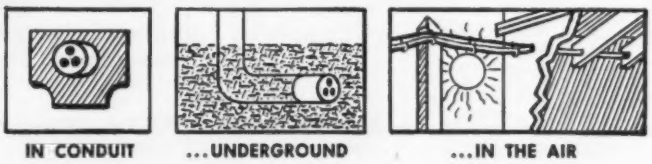
built for those TOUGH JOBS!

Small sizes or large . . . one, two or three conductors . . . moisture-resisting insulation . . . from 0 to 5,000 volts . . . Durasheath is built for rugged service:

Durasheath offers high tensile strength and resistance to impact and abrasion—*plus* extreme flexibility that makes it easier to handle. Also, Durasheath resists moisture, acids and alkalies generally found in the soil, eliminates problems of electrolysis, corrosion and extremes in temperature and is highly resistant to flame—making it possible to use a single type and size of cable in runs that are partly aerial, partly underground or in conduit.

For complete information, write for Publication C-27.

48450



IN CONDUIT ...UNDERGROUND ...IN THE AIR

Anacondaloy*-coated copper conductors are insulated with a moisture-resisting synthetic rubber compound, bound with color-coded rubber-filled tape and enclosed in a tough, high mechanical strength, moisture and flame-resistant outer jacket of Neoprene. Conductors have the lasting protection of a solid block of synthetic rubber and Neoprene.

*Reg. U. S. Pat. Off.

Durasheath

AN *Anaconda* PRODUCT

ANACONDA from mine to consumer

ANACONDA WIRE AND CABLE COMPANY

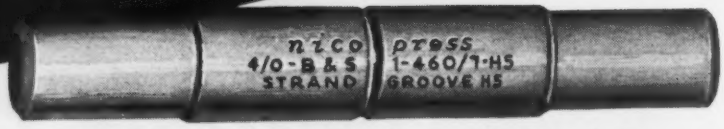
25 Broadway, New York 4, N. Y.

Announcing

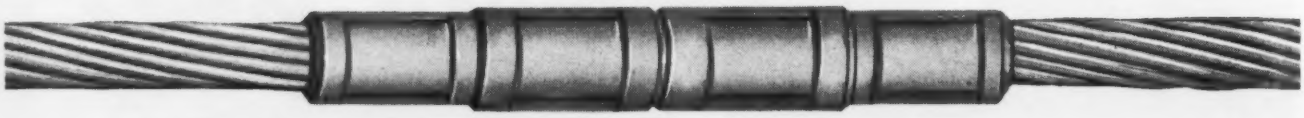
The Nicopress No. 635 HYDRAULIC TOOL and SPLICING

Nicopress SPLICING SLEEVES

FOR LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

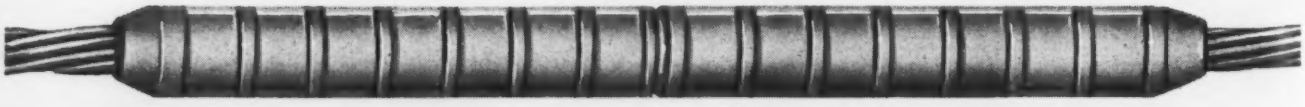


Light in weight—Holds full strength of conductor—High in conductivity



Completed Nicopress Splice on 4/0 Copper Conductor

Completed Nicopress Splice on 3/8" Extra High Strength Copperweld Strand



Completed Nicopress Splice on 3/8" Extra High Strength Galvanized Steel Strand

THE NATIONAL TELEPHONE SUPPLY COMPANY

The National

5100 SUPERIOR AVENUE

Canadian Mfr.: N. SLATER CO., LTD., HAMILTON, ONTARIO, CANADA

SLEEVES for LARGE CONDUCTOR & STATIC WIRE Ssplicing

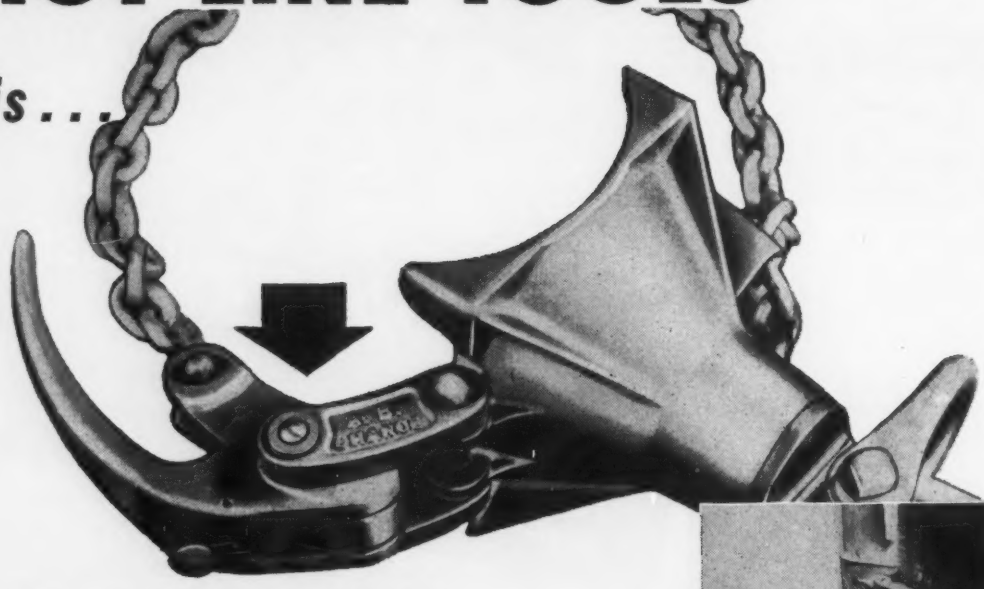
Nicopress No. 635
HYDRAULIC TOOL
FOR INSTALLATION OF NICOPRESS SLEEVES ON LARGE CONDUCTORS AND HIGH-STRENGTH STRANDS

The Nicopress No. 635 Hydraulic Tool, with interchangeable dies, covers a wide range of large conductors in copper, copperweld, A.C.S.R. and Steel. This portable tool has ample capacity (35 tons) to easily compress full strength Nicopress Sleeves on all grades of strand, including Extra High Strength.

Telephone Supply Company
CLEVELAND 3, OHIO
Export Distributor: INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK, N. Y.

New CHANCE *Aluminum Fitted* HOT LINE TOOLS

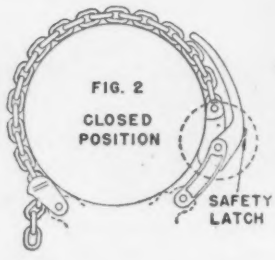
have this . . .



EASY to APPLY, SAFE LOCKING CHAIN TIGHTENER

Now all Chance Hot Line Tools, which are designed for attachment to poles, are equipped with a new light weight chain tightener that can be quickly secured to the pole by a lever operation and is latched with a specially designed safety catch. Except for the small safety latch trigger, connecting bolts, and the chain, the metal parts are made of aluminum alloy and then heat treated to give them added strength. These aluminum parts have been tested and proved to be considerably stronger than the high-strength steel loading chain which has a breaking load in excess of 6000 pounds. The use of aluminum reduces the weight linemen are required to handle on the pole. The lever operation makes application of the chain tightener much easier and faster than the old screw take-up method.

The illustrations at right show the steps of application. First, the chain is wrapped around the pole and engaged in the chain socket while the tightening lever is in open position. (Fig. 1) To tighten, the lever is moved to closed position (Fig. 2) and the safety catch automatically latches. If chain is too loose, the tightener may be released and the chain taken up a link in the chain socket, or a half link adjustment can be made in the take up. (Fig. 3) It is necessary to depress the safety latch and at the same time pull the lever as suggested in the lower photograph in order to release the tightener. Thus, there is no danger of a lineman accidentally loosening the tightener.



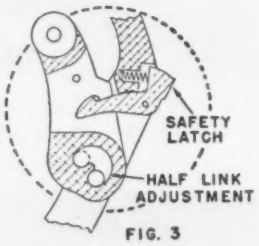
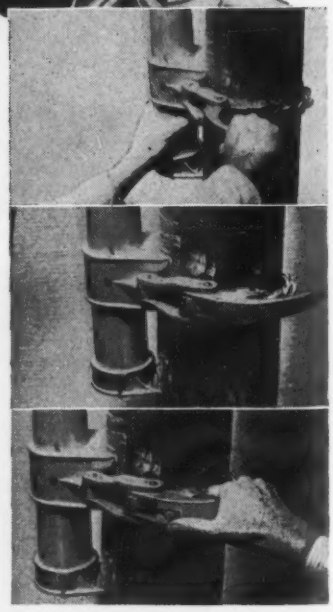


FIG. 3



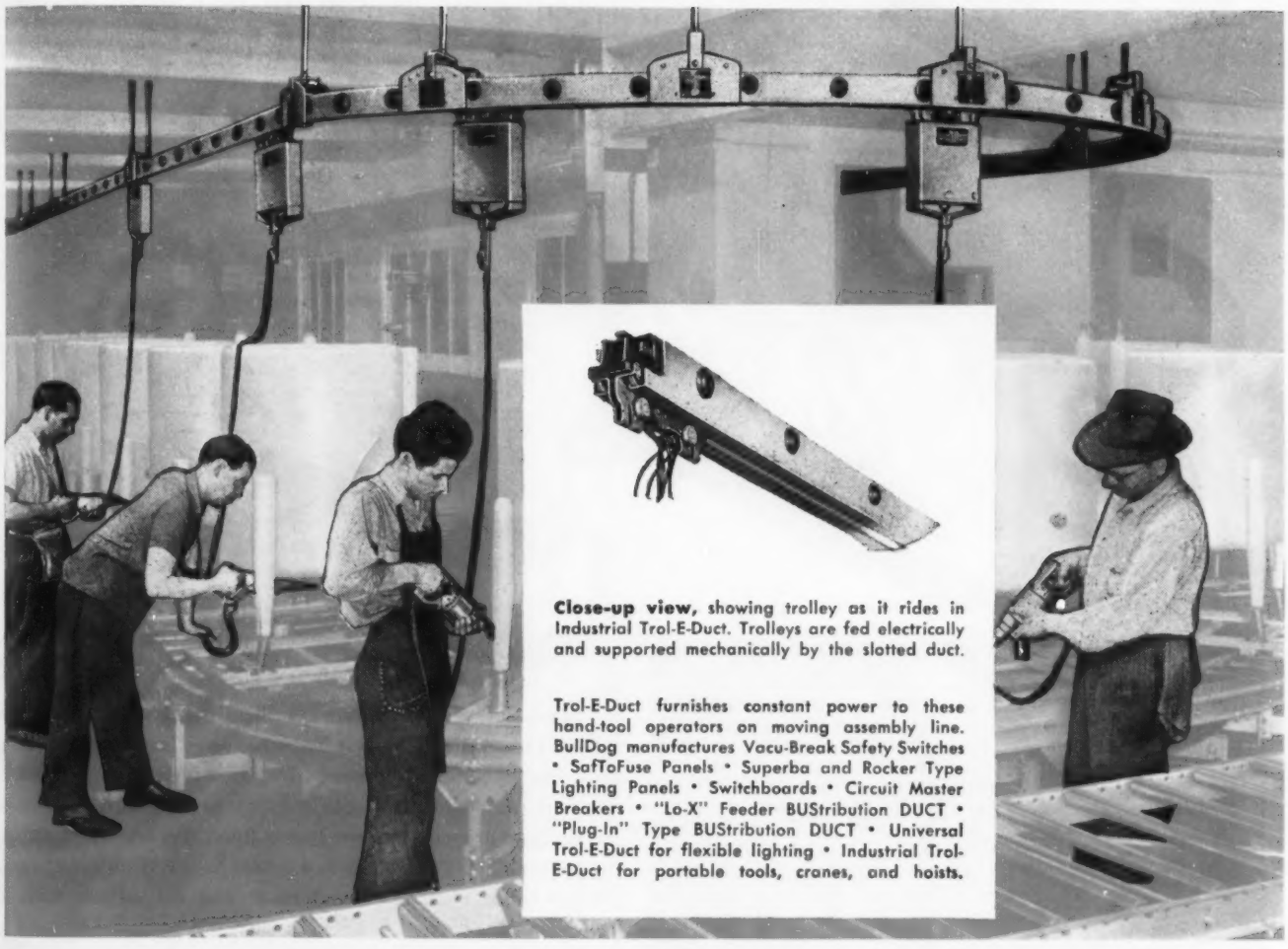
- **Speed in attaching equipment to poles.**
- **Light weight.**
- **Over toggle latching that holds handle in closed position.**
- **Safety catch to prevent accidental unlatching.**
- **Each unit checked for proper latching before shipment.**
- **Metal Fittings are X-ray inspected.**

C479A

A·B·CHANCE CO·

CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES



Close-up view, showing trolley as it rides in Industrial Trol-E-Duct. Trolleys are fed electrically and supported mechanically by the slotted duct.

Trol-E-Duct furnishes constant power to these hand-tool operators on moving assembly line. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panels • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution DUCT • "Plug-In" Type BUStribution DUCT • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, and hoists.

These trolleys save more than carfare

. . . considerably more, in fact!

You can fatten your wallet on the savings you get with BullDog Industrial Trol-E-Duct . . . and breathe easier, too, as production headaches walk out of your life.

Your outlet follows the job

BullDog Industrial Trol-E-Duct is a flexible electrical system. Current is carried by copper bars encased in insulated steel duct. Trolleys, moving along the continuous slot in the bottom of duct, transmit current from bus bars to portable electrical tools, cranes, hoists and other moving "loads." Since outlets (trolleys) move with the job, no lengthy extension cords clutter the floor and men work unimpeded.

Ideal for assembly lines

Electrical outlet problems for assembly lines are solved with BullDog Industrial Trol-E-Duct. The slot in the bottom of Trol-E-Duct casing is continuous through straight sections, fittings, around curves . . . a safe, smooth path for the outlet (trolley) which follows the worker and his job. Whether he operates a hand tool, a hoist, or even a crane, Trol-E-Duct makes the job easier, saves time, and increases production.

Call in a BullDog Field Engineer for data on this remarkable power distribution system. He'll be glad to advise you in any way. If you'd like, he can arrange to show you a similar installation near your own plant.

BullDog's Field Engineers welcome the chance to sit in on planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation and maintenance costs, as well as highest efficiency and reliability in actual operation. Why not take advantage of this pre-building service?

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

Coast Electric & Manufacturing Co.
1720 N. E. Sixth Avenue Tel., Garfield 2844
Portland, Oregon

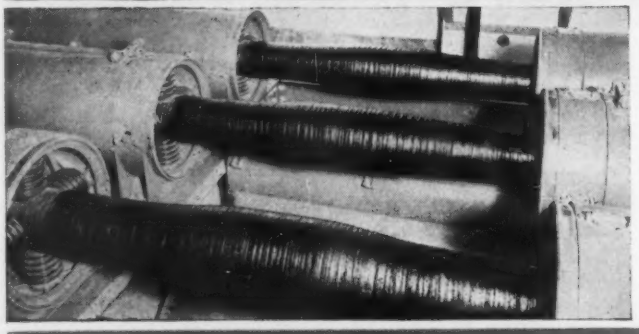
Safety Switchboard Company
1445 Stevenson St. Tel., Hemlock 1-2470
San Francisco, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel., Jefferson 2224
Los Angeles, Calif.

3 naturals for utilities!

Irvington oil-immersed tape:

Manufactured to exacting specifications, Irvington Seamless Bias Varnished Cambric Tape has excellent electrical properties. Packing in impregnating oils indefinitely preserves these high values, reduces moisture pick-up as well as oxidation and preserves power factor. Special processing produces LOW LOSS TAPE with low power factor. Both are specified for cable splicing, transformer and oil switch terminal connections.



Irvington seamless bias varnished cambric tape—dry packed.

Supplied in tightly wound rolls, wax sealed to exclude moisture and air thereby preventing deterioration. Has high dielectric strength with sufficient tensile strength and elongation to be tightly and evenly wrapped. Excellent for insulating coils, splicing low voltage cable, wrapping bus bars and other high voltage conductors.

HARVEL OIL STOP. A time saving, cost reducing compound that keeps oil in and water out. Used with Irvington Seamless Bias Varnished Cambric, Oil Stop makes cable splices, stop joints, and terminals oil tight and moisture proof. Applied as a solvent-free liquid, Oil Stop quickly polymerizes into a firm, infusible phenol-formaldehyde insulation. Adheres to rubber, oil-impregnated paper, fibre, Bakelite, and copper. Also used as potting and filling compound for enclosed coils; and many oil field applications.

Test the outstanding properties of these insulations. Send for generous samples.

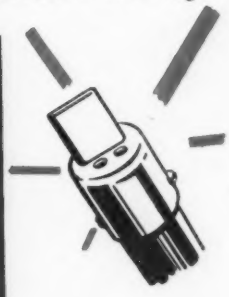
IRVINGTON VARNISH & INSULATOR COMPANY
Irvington 11, New Jersey

What's your score?

(A three-minute test on the effective use of wiring materials)

1 Existing service entrance consists of ¾-inch conduit containing two No. 8 Type R wires. How can this installation be made suitable for an electric range without tearing out the conduit?

A — *Install a second service entrance.*
B — *Run two No. 6 Type T wires and one bare No. 8 conductor in existing conduit.*
C — *Tap into the next door neighbor's circuits.*

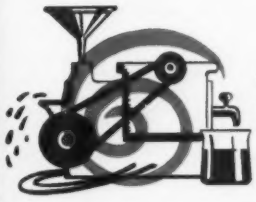


2 Why are fuse contacts sometimes silver-plated?

A — *Silver provides unusually fine conductivity.*
B — *Silver contacts cannot arc.*
C — *They look better with silver.*

3 Many new buildings going up today will need provision for future FM and television wiring. What is an easy way to plan for this wiring?

A — *Ask someone who has wired buildings for television.*
B — *Double the capacity of all circuits.*
C — *Provide flexible conduit raceways for lead-in wires.*



4 A million feet of what famous wire was used in what fabulous machine and by what university?

A — *Deltabeston**
B — *The Navy's Mark II calculator*
C — *Harvard University*

Answers

1 Okay, if you chose *B*. And you'll be wise to make it General Electric thermoplastic every time you choose a building wire, because General Electric has always been a leader in the production and sale of thermoplastic-insulated wire.

2 Make it *A*, because silver oxide has the unusual property of reverting to pure silver when it gets hot. Silver-plated contacts eliminate premature blows from heating due to oxidation. That's one reason why G-E Silvend fuses are so efficient, regardless of how long they remain in service.

3 Pick *C* for this one. Flexible conduit provides an economical and easily installed, permanent raceway. Wires can be fished through at any time that new circuits are needed.

If you picked *A*, you were on the right track, too, but you can do better by asking your supplier about G-E flex.

4 It takes *A*, *B*, and *C* to run up a score on this one, because they're all correct. We put them all in, because it is a pretty good testimonial to the reputation of heat-resistant General Electric Deltabeston. Users everywhere will agree.

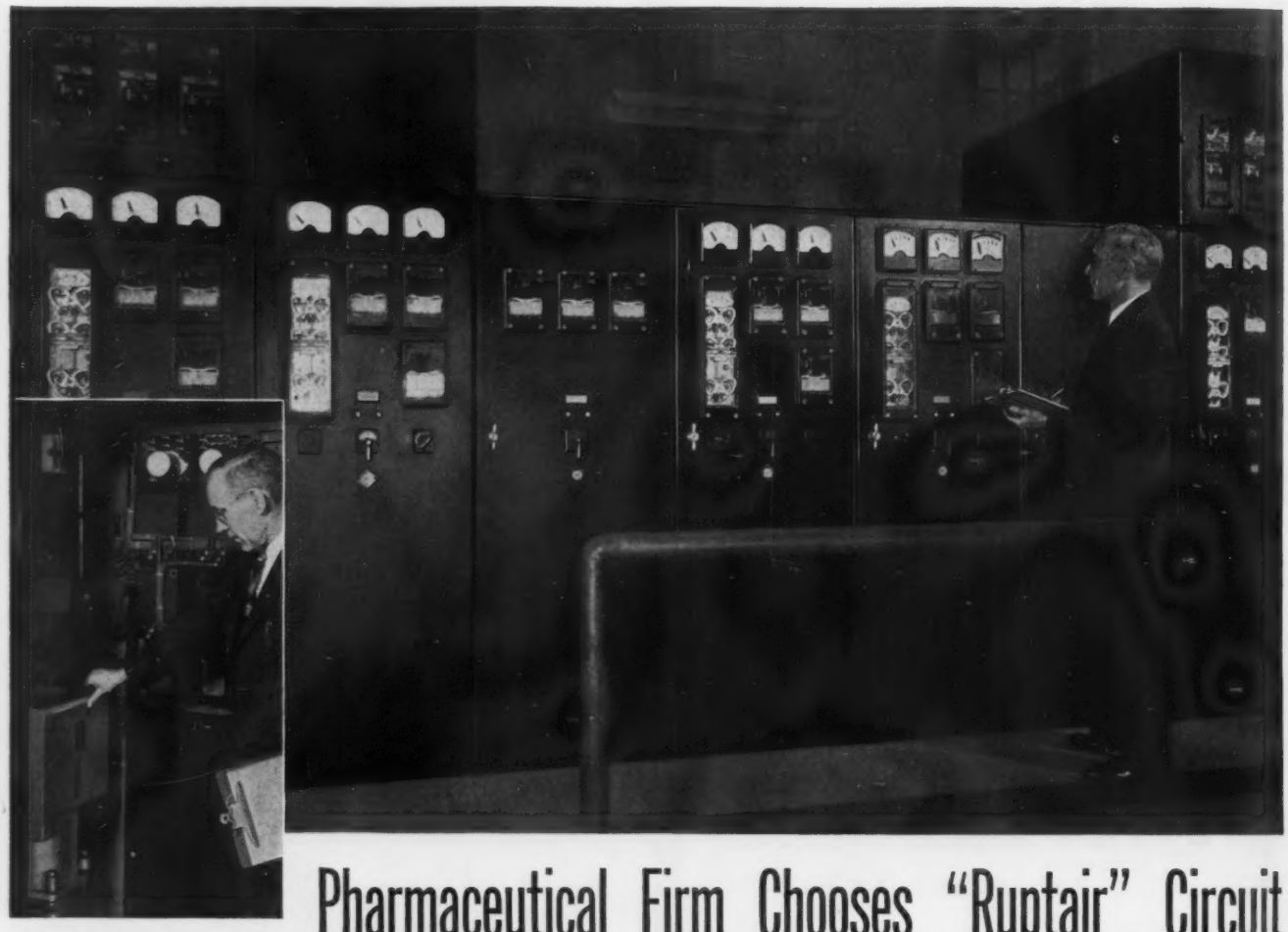
We hope this little quiz was fun. And maybe it will help to give you a better picture of G-E Construction Materials—the full line for all wiring needs. Each part of the line is made for ready use with other G-E wiring materials. It's a line that has been designed for your convenience—in ordering—in installation—and in maintenance. And it is backed up by experienced men who are always ready to help you with engineering and application counsel on your every job. It's the kind of *one source, one complete line* service that makes it easy for you and your customers to do a top-notch wiring job. If you want information on any of our products, please write to Section K3-225, General Electric Company, Bridgeport 2, Connecticut.

* Trade-mark Reg. U. S. Pat. Off.

Construction Materials

GENERAL ELECTRIC

RELIABLE METAL-CLAD SWITCHGEAR



Automatic disconnection of contacts, completely enclosed buses, mean safe and easy inspection of the breakers.

Pharmaceutical Firm Chooses "Ruptair" Circuit Breakers to Safeguard Electrical System

COMPLETELY RELIABLE electrical protection is *especially important* in manufacturing medical drugs. To get such protection, one of the nation's largest pharmaceutical firms brought its switchgear problem to A-C. The solution was *Ruptair* magnetic air circuit breakers integrated in Allis-Chalmers metal-clad switchgear. These units, with an interrupting capacity of 150,000 kva each, provide this plant with the complete electrical protection it requires.

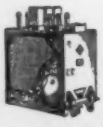
* * * * *

It was Allis-Chalmers who first introduced metal-clad switchgear to the U.S. Today, it is Allis-Chalmers who offers one of the world's most complete lines of metal-clad switchgear for all applications. Bring your problems to experts . . . call our nearest office or write: ALLIS-CHALMERS, MILWAUKEE 1, WIS.

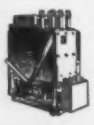
A 2274

Allis-Chalmers Builds all four Types of Circuit Breakers

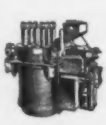
AIR BLAST available in interrupting capacities from 250,000 kva to 500,000 kva.



MAGNETIC AIR. A-C trademark *Ruptair*. Capacities: 50,000 to 250,000 kva.



OIL — A-C trademark *Ruptor*. Interrupting. Capacities: 50,000 to 500,000 kva.

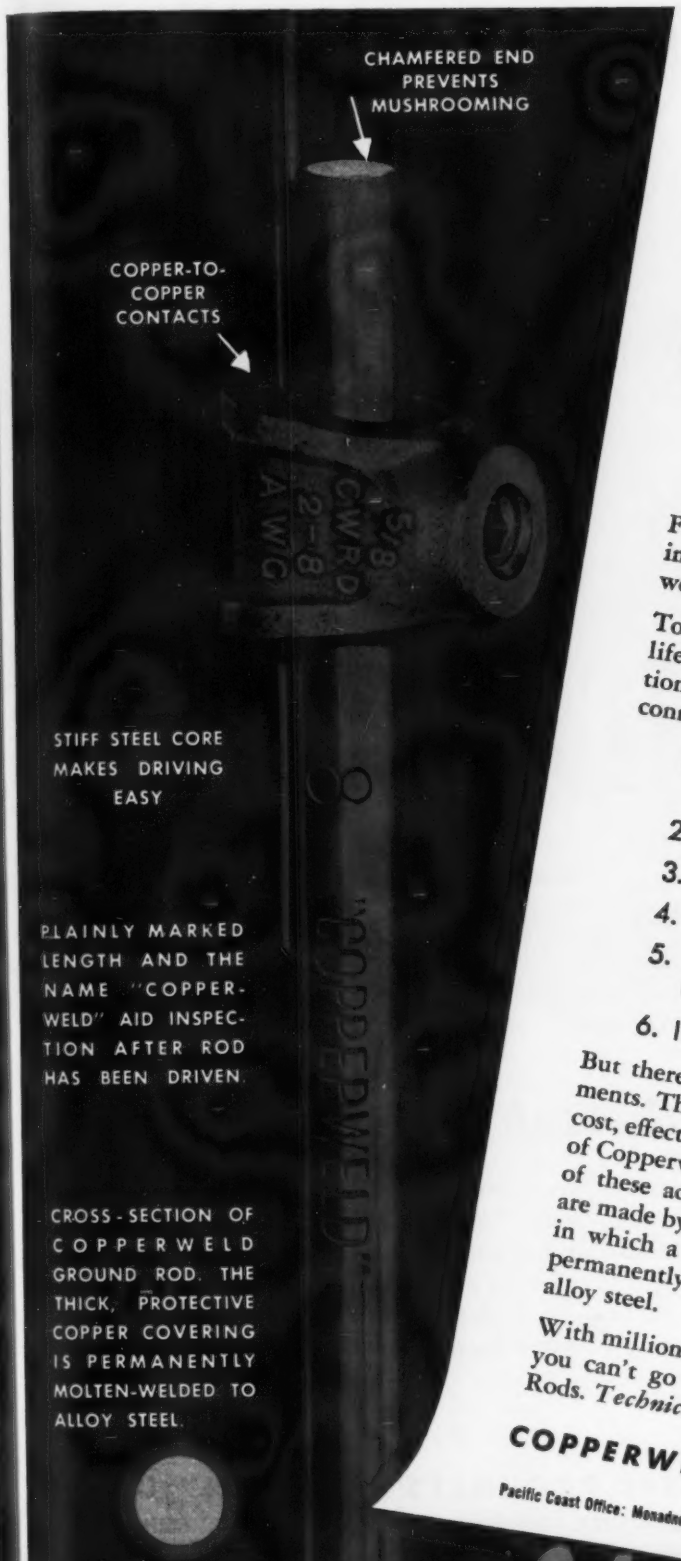


LOW VOLTAGE—Metal enclosed dead front; 25,000-50,000 A. I. C., 600 v a-c max

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great


CHAMFERED END PREVENTS MUSHROOMING
COPPER-TO-COPPER CONTACTS
STIFF STEEL CORE MAKES DRIVING EASY
PLAINLY MARKED LENGTH AND THE NAME "COPPERWELD" AID INSPECTION AFTER ROD HAS BEEN DRIVEN.
CROSS-SECTION OF COPPERWELD GROUND ROD. THE THICK, PROTECTIVE COPPER COVERING IS PERMANENTLY MOLTEN-WELDED TO ALLOY STEEL.
COPPERWELD

THE "LOWDOWN" ON Good Grounding

For the benefit of newcomers in the electrical industry and as a reminder for old timers, we would like to re-state a few basic facts.

To insure permanent, low-cost protection to life and property and to improve the operation of electrical systems, a pole line ground connection must meet these requirements:

1. It Must Have Good Electrical Conductance
2. It Must Be Able To Resist Corrosion
3. It Must Reach Permanently Moist Soil
4. It Must Be Rugged And Easy-To-Drive
5. It Must Have Copper-To-Copper Contacts From Pole To Ground
6. It Must Be Easy To Inspect

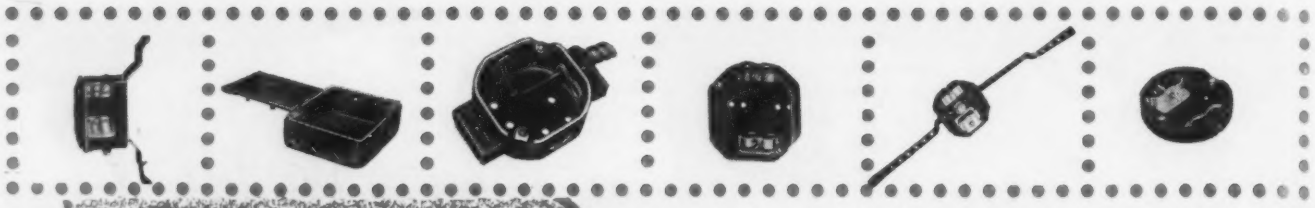
But there's no need to memorize these requirements. There's a much easier way to insure low-cost, effective grounds. Simply use the proper size of Copperweld Ground Rods and you will get all of these advantages. Copperweld Ground Rods are made by our unique Molten-Welding Process in which a thick, protective layer of copper is permanently welded to a core of high-strength alloy steel.

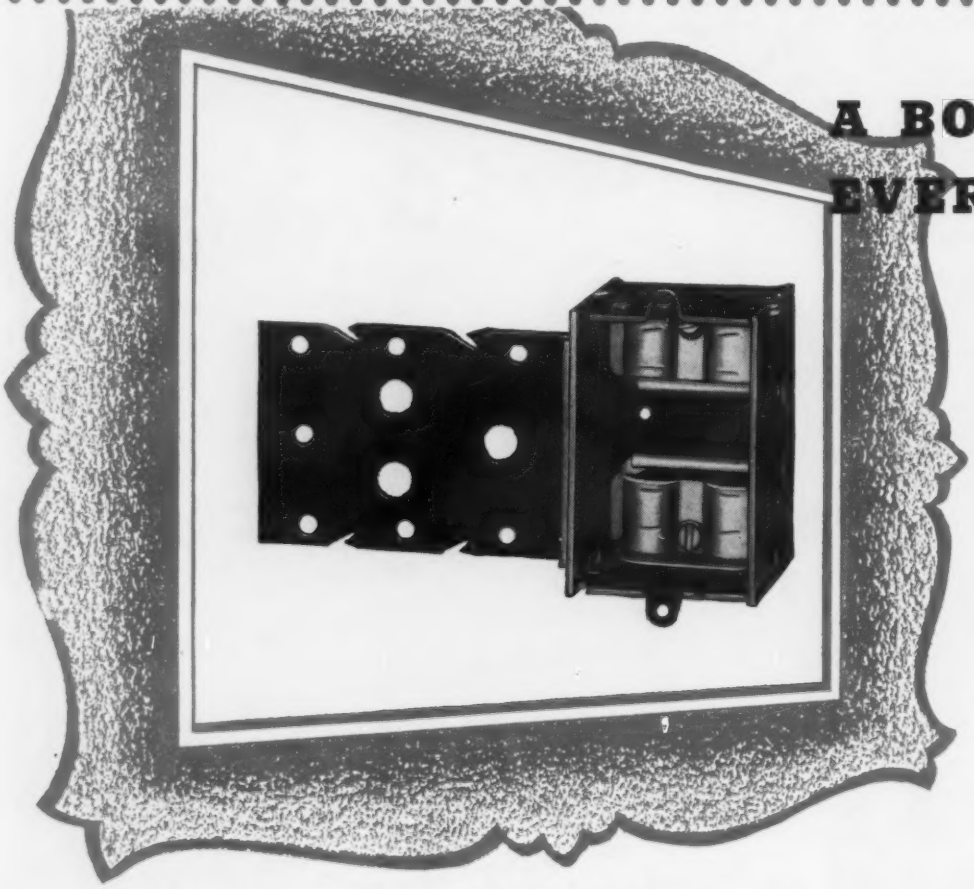
With millions of them giving dependable service you can't go wrong with Copperweld Ground Rods. *Technical Bulletin sent on request.*

MADE BY
COPPERWELD STEEL COMPANY
GLASSPORT, PA.
Pacific Coast Office: Monadnock Building, San Francisco, California

Copperweld GROUND RODS AND CLAMPS

stocked and sold by { HUBBARD & COMPANY, National Sales Agents and all their distributors and JOSLYN MFG. & SUPPLY CO., National Distributors





A BOX FOR EVERY NEED

RACO MCBN3 BOX

A real time saver in a STEEL bracket switch box. Long nailing prongs gauge in bracket and hold box in correct position until nails are driven. "NM" clamp affords complete protection to the cable and provides entrance to box from ends and back—or both. Bracket is projection welded—knockouts are "Pri-Out" equipped.

You can always rely on Raco

RACO PRODUCTS ARE LISTED BY UNDERWRITERS LABORATORIES, INC.

RACO

ALL-STEEL PRODUCTS

RACO Switch and Outlet Boxes

Electrical contractors . . . wholesalers and salesmen . . . builders and architects—they ALL prefer the RACO line of switch and outlet boxes. This nation-wide preference has been built throughout *many years* on the solid foundation of QUALITY, DEPENDABILITY, and COMPLETE breadth of line. There's a sturdy RACO box in black enamel or galvanized finish for every need. Send for Raco catalog.

* * *

A-S-E STEEL PRODUCTS FOR MANY USES

STEEL OFFICE FURNITURE • WARDROBE, STORAGE, AND COMBINATION CABINETS • CLOTHING LOCKERS • INDUSTRIAL EQUIPMENT FOR FASTER MATERIALS HANDLING • FROZ-N-FOOD LOCKERS • ELECTRICAL OUTLET AND SWITCH BOXES.

ALL-STEEL EQUIPMENT INC., 500 Kensington Avenue, Aurora, Illinois

A Complete Line of Switch and Outlet Box

ALL-STEEL EQUIPMENT INC.

CRESCENT SYNTHOL

TYPE TW

For Both Dry and Wet Locations

Synthol Type T.W. is the most desirable and lowest cost Building Wire for use in WET LOCATIONS under Sec. 3102b of the 1947 National Electrical Code in raceway systems: (1) Underground, (2) In concrete slabs or other masonry in direct contact with earth, (3) In wet locations, (4) Where condensation or accumulation of moisture within the raceway is likely to occur.

CRESCENT SYNTHOL Building Wires and Cables are insulated with a special, tough, thermoplastic compound that results in wires of unexcelled Permanence, Safety, Adaptability and Value. They combine high dielectric and mechanical strength with the following desirable features.

SMALL DIAMETER—has smallest outside diameter for same conductor size, permitting more conductors, or larger conductors in same space.

FLAME RETARDING—SYNTHOL insulation will not support combustion.

LONG LIFE—practically unaffected by continuous exposure for years to sunlight or air; more stable than any rubber insulation.

RESISTANT to moisture, acids, alkali and most chemical solvents.

OILPROOF—cutting oils, greases and petroleum solvents do not injure SYNTHOL.

BRIGHT COLORS—non fading, the insulation is the same color throughout so color will not scrape off; easily cleaned; twelve colors.

FREE STRIPPING—makes splicing and soldering easier and faster.

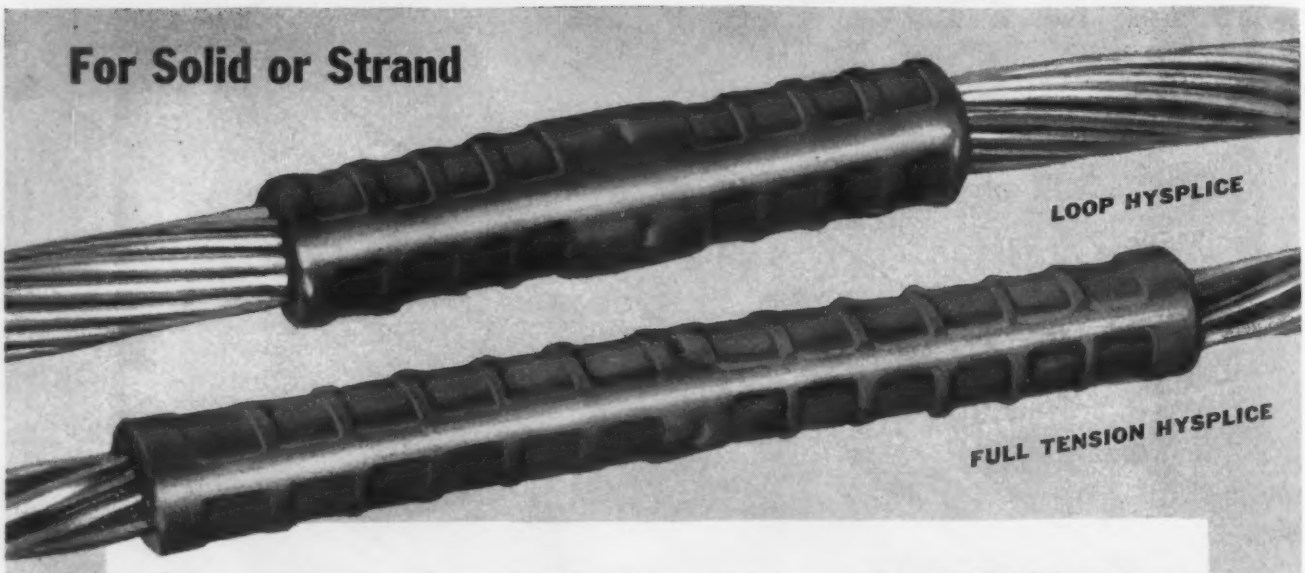
EASY PULLING—because SYNTHOL wires have a permanent clear wax lubrication on their hard, smooth, abrasion resistant surface.

CRESCENT
WIRE & CABLE

CRESCENT INSULATED WIRE & CABLE CO.

TRENTON, N. J.

BURNDY Hysplice



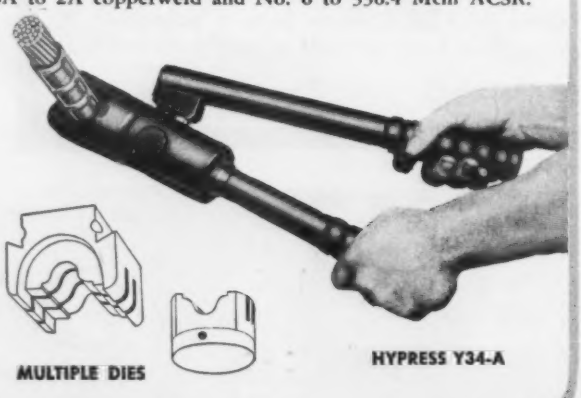
Keyed with BERYLLIUM-COPPER

Beryllium-Copper particles line the inside wall of each Burndy Hysplice, providing a hard gripping medium when installed on solid or stranded copper and copperweld overhead conductors.

INSTALLATION

BURNDY HYPRESS Y34-A can be easily operated either on the ground or at the pole top. It weighs only nine pounds and is fully insulated. For a convenient working position, the HYPRESS head can be rotated 90° with respect to the handles. When indenting the Hysplice the ram of the HYPRESS need not be fully retracted. After the indent is made, open the hand valve enough to release the ram die sufficiently to move the HYPRESS to the next indenting position. (Larger Hysplices require Burndy HYPRESS Y48-B.)

HYSPLICE DIES, single or multiple, which insure correct indenting depth on the Hysplices, are available to accommodate all conductor sizes from No. 8 to 300 Mcm copper, 6A to 2A copperweld and No. 6 to 336.4 Mcm ACSR.



HIGH CONDUCTIVITY . . . assured by the union of a pure copper Hysplice, beryllium-copper particles and the conductor — all highly conductive materials.

FULL TENSILE STRENGTH . . . assured by the high-compression circular indent of the HYPRESS, plus the rough keying action of the hard, heat-treated beryllium-copper particles.

EASILY INSTALLED . . . Hysplices are available for Full Tension Splices or for Moderate Tension Loop Splices, both installed with the familiar Burndy HYPRESS described here.

FOR ACSR . . . Hysplices are filled with "Penetrox A" compound which exerts a wiping action on the conductor, penetrates oxide film, keeps out moisture and assures a low-resistance connection. (Loop Hysplices only)

For complete information ask your local Burndy representative, or write directly to

BURNDY
NEW YORK 54, N. Y.

Western Branch: Vernon 11, Calif. Canada: Canadian Line Materials, Ltd., Toronto 13. Foreign: Philips Export Corp., New York 17, N. Y.

G & W ELECTRIC SPECIALTY CO., 7780 Dante Ave., CHICAGO 19, ILL.

POTHEADS—*Three Conductor*—Type "T" Outdoor and Type "NT" Indoor

Max. Cond'r Size Mcm *	Max. Diam. Cable Inches §	SHAPE "B" CATALOG NUMBER	SHAPE "B" LIST PRICE	Parts Symbols Body	Lid	Porcelain	Dimensions—Inches W	B	D	E	F	G	A	C	Approx. Ship'g Weight Lb.	Approx. Comp'd Req'd Gal.
600 VOLTS OUTDOOR (Flashover 40Kv. dry, 25Kv. wet) **2500 VOLTS INDOOR**																
1/0	1¾	T3203B	34.50	F3C†	CF3B	CK	9	4½	5½	3	6½	6⅛	2	4⅛	30	¾
250	2⅞	T3224B	37.50	F4C†	CF3B	CK	9	6½	5¾	3	8½	6½	2	4¼	39	1
2500 VOLTS OUTDOOR (Flashover 50Kv. dry, 30Kv. wet) **5000 VOLTS INDOOR**																
1/0	1¾	T3303B	36.75	F3C†	CF3B	CL	9	4½	5½	3	6½	7⅛	2⅜	4½	31	¾
250	2⅞	T3324B	39.75	F4C†	CF3B	CL	9	6½			8½	7½	2⅜	4⅝	40	1
500	2⅞	T3354B	58.50	E4C‡	DE3BX	DN							2⅝	5⅜	55	1½
750	3½	T3375B	76.50	E5C‡	DE3BX								2¼	5⅝	64	1¾
1000	3½	T3385B	87.75	E5C‡	DE3									5⅝	71	1¾
5000 VOLTS OUTDOOR (Flashover 60K																
1/0	1¾	T3403B	39.00												33	¾
250	2⅞	T3424B	42.00												42	1
500	2⅞	T3454B													66	1¾
7500 VOLTS OUTDOO																
1/0	2⅞	T35														1¾
250	2⅞	T3														1¾
500	2⅞															1¾
750	3½															3½
1000	3½															3½
15000 VO																
1/0																3
250																
500																½
750																½
1000																½
1500																
1/0																5½
250																5½
500																5½
750																5½
1000																5½
23000																
1/0															147	5½
250															150	5½
500														8	140	5½
7500 VOL																
1/0	2⅞													7⅞	61	1¾
250	2⅞												5½	8	64	1¾
500	2⅞											¼	5½	8¼	68	1¾
750	3½											11½	6⅛	9⅞	93	3½
1000	3½	N									11½	12⅛	6⅛	10¼	100	3½
15000 VOLTS INDOOR																
1/0	2⅞	NT3704B	6													
250	2⅞	NT3724B	67.50													
500	3½	NT3755B	82.50	J5C‡	EJ3B2X	EF										
750	3½	NT3775B	105.00	J5C‡	EJ3B2X	EH										
1000	3½	NT3785B	116.25	J5C‡	EJ3B2X	EH										
23000 VOLTS INDOOR (Flashover 100Kv. dry) ▲																
1/0	3½	NT3805B	97.50	K5C‡	E	EL										
250	3½	NT3825B	97.50	K5C‡	E	EL										
500	3½	NT3855B	112.50	K5C‡	E	EL										

Insulating compound not included in above prices. See page 3.
*Also current rating, one ampere per Mcm.
§Wiping sleeve takes ½" larger diameter cable.
†Style 1 bracket. ‡Style 4 bracket.
Standard aerial lugs included in above prices. See page 27. Specify style wanted.
Standard cable entrances included in prices. See page 28. Specify style wanted.
CONDUIT COUPLINGS or ARMOR CLAMPS
Priced extra: (Cast Iron).
Up to 2½"—$1.50; 3"-4"—$3.00, over 4"—$4.50 list.
See page 28. Specify size wanted.
BE SURE TO GIVE CABLE DATA & CONDUIT SIZE.

TYPE "T" & "NT" 3 CONDUCTOR SHAPE "B"

...E SAME ...T VOLTAGE OUTDOOR TYPE USING SAME BODY & LID PARTS.

Fig. 31— CAT. NO. T3554B (H4C body shown.)

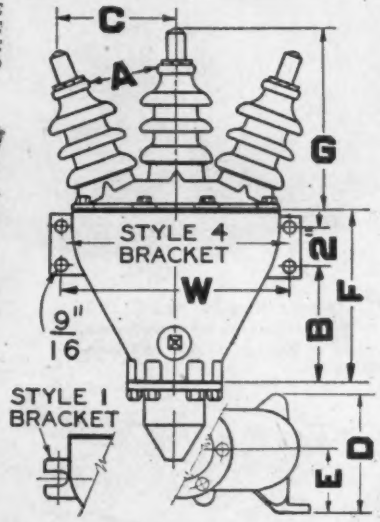


Fig. T3B—DIMENSIONS 3 conductor, Shape "B".

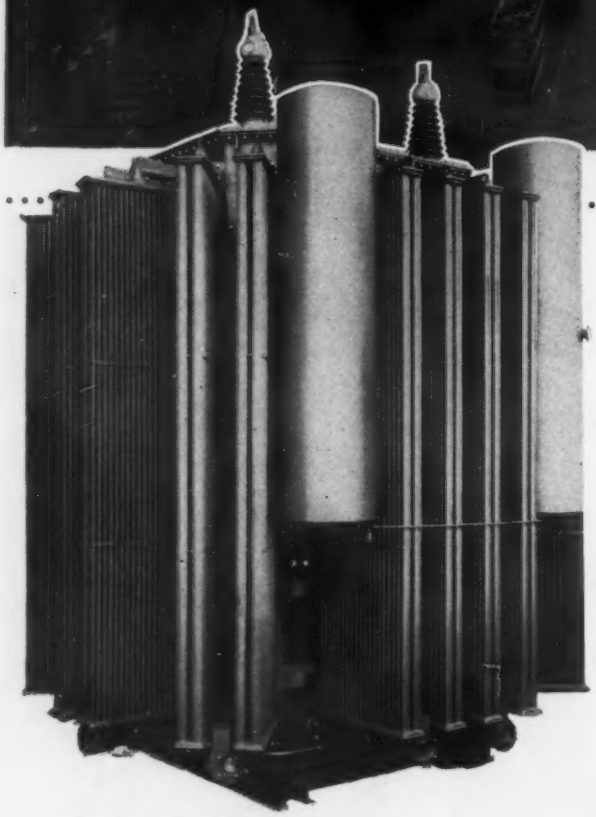
CAPNUT HERMETICALLY SEALS TOP OF PORCELAIN • INTERCHANGEABLE AERIAL LUGS

Send for New G & W Bulletin No. 147

One convenient catalog of 72 pages listing, with dimensions and prices, G&W Cable Accessories—

POTHEADS...BOXES...
OIL FUSE CUTOUTS..
OIL SWITCHES.

G & W Electric Specialty Co.
7782 Dante Ave.
Chicago 19, Ill.



20,000-kva self-cooled and 25,000-kva forced-air-cooled transformer, typical of Wagner design and manufacture.

"Built by Wagner" means - it's dependable!

Wagner, a pioneer in the development of transformers, has the experience, background, and facilities to build transformers for every need. Wagner transformers have been known for their dependability for over fifty years. During this time they have established a reputation for excellent performance in electric power systems throughout the country.

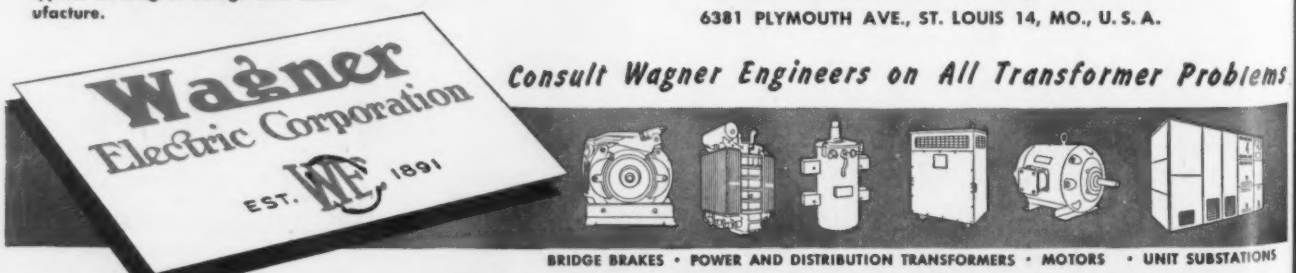
Wagner Transformers are dependable because they are liberally designed with extra factors of safety, constructed of carefully selected materials, and are skillfully engineered, built and tested in Wagner's transformer shops.

Users of power transformers will find it to their advantage to consult Wagner on their next transformer installation. Users of Wagner transformers also profit by our quick, convenient, nationwide service facilities. Twenty-nine branch offices, located in principal cities and manned by trained field engineers, are ready to serve you. Write for Bulletins TU-180 and TU-181 for information on the complete line of Wagner Transformers.

Wagner Electric Corporation

6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.

Consult Wagner Engineers on All Transformer Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL AND AUTOMOTIVE PRODUCTS

T48-4

75 YEARS MANUFACTURING EXPERIENCE back every THOMAS Insulator

Seventy-five years ago, The Thomas Company started ceramic manufacture. During this three-quarters of a century, Thomas has pioneered many firsts in the insulator field.

Consider Suspension-Strain Insulators as an example. The Thomas Company built the *first* commercial Cap-and-Pin Suspension Insulator back in 1907. Since then, we have constantly refined the design and improved its quality. The result is the Thomas Suspension-Strain Insulator you see here . . . the only insulator with such an enviable and unsurpassed "pedigree".

Despite these unusual times, when quality and skilled workmanship could be sacrificed, you can specify Thomas Insulators with full confidence that quality and value cannot be surpassed.

All Thomas Insulators have been constantly improved . . . quality workmanship is still the watchword of all production. Each insulator has the plus values to meet every type of line condition. Standard designs may be selected for your toughest assignments.

EARLY THOMAS DEVELOPMENTS

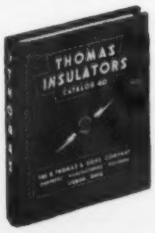
First High-Voltage, Multi-Part, Pin-Type Insulator. First Cap-and-Pin, Suspension-Strain Insulator.

Many of these are still in operation. They are the best proof of the long life and stamina of Thomas Porcelain.

1873 THOMAS INSULATORS our 75th year RELIABILITY 1948

YOUR LETTERHEAD BRINGS THIS FREE CATALOG

. . . which illustrates and describes the complete Thomas Line. Enclosed in a loose-leaf binder, it provides a ready reference for all Transmission-Distribution Insulators and Associated Line Hardware. New Insertions, as issued, are sent to all catalog holders.



The R. Thomas and Sons Co.

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Phoenix

"...Practical Perfection..."

A. G. de Wolfe "brought to practical perfection a machine for insulating all kinds of telegraph wires," said his obituary in 1896. And at the time of his invention, the telegraph industry was the only industry requiring insulated wire.

It was Mr. de Wolfe's mechanical genius that made possible the application of A. G. Day's remarkable invention of Kerite insulation, for at the time Mr. Day produced Kerite, no suitable means of applying it to wire existed.

Down through the years, Kerite engineers have kept on working for new and better things. And they have contributed many advances to the art of cable making. But one thing has never changed:

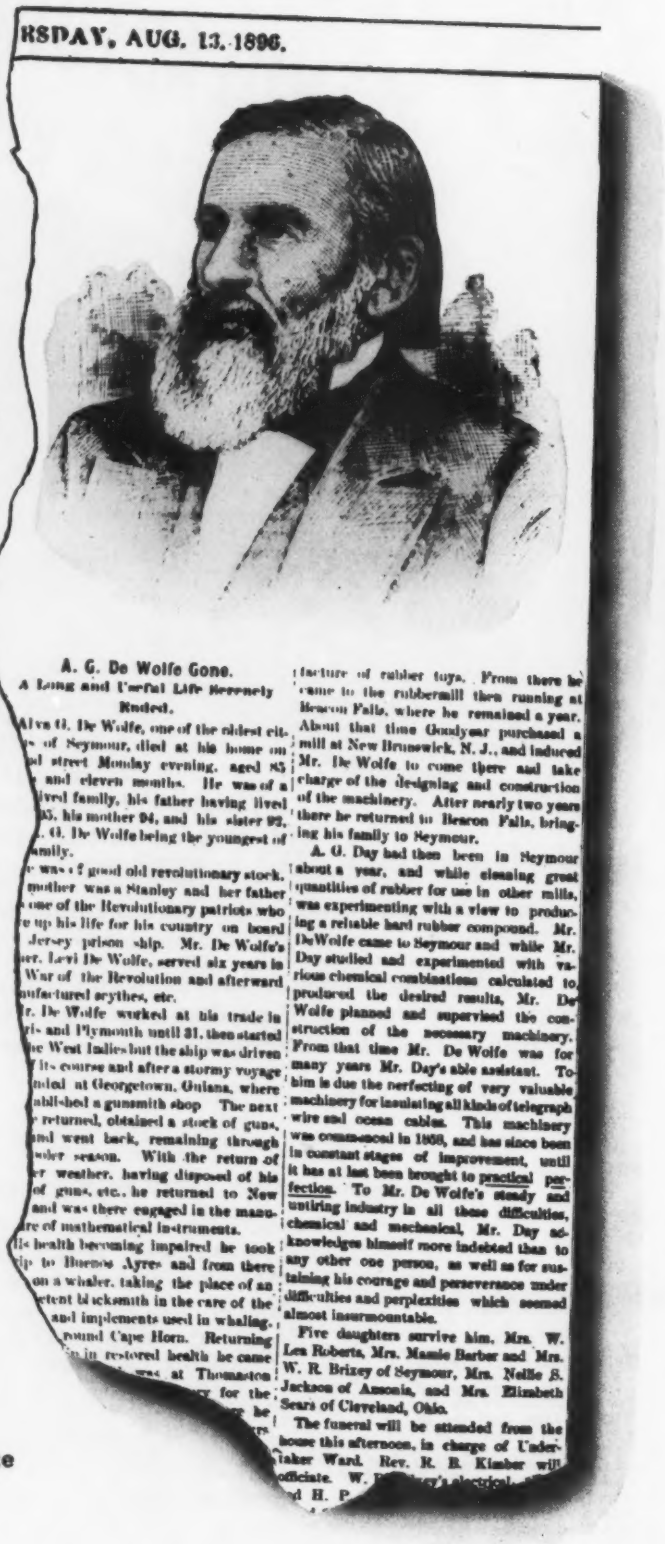
The Kerite insulation of today is still based on the original Kerite, which has always been the secret of Kerite's long life and low cost per year.

The proof of this remarkable insulation is found in Kerite cable that has been in use for nearly two generations of continuous operation.

For example, one Kerite 600-volt, 19-conductor cable installed 59 years ago still has an average breakdown voltage to ground of 31,500 volts.

Kerite insulated wire and cable is available in many forms and for many purposes—low or high voltage, indoor, outdoor, aerial or submarine. Ask any Kerite user about its stamina and low cost per year. *The Kerite Company, 30 Church St., New York 7, N. Y.*

Offices also at: 122 S. Michigan Avenue, Chicago 3; 582 Market Street, San Francisco 4; 714 W. Olympic Blvd., Los Angeles 15.



RSDAY, AUG. 13, 1896.

A. G. De Wolfe Gone.

A Long and Useful Life Serenely Ended.

Alva G. De Wolfe, one of the oldest citi- of Seymour, died at his home on d street Monday evening, aged 85 and eleven months. He was of a ived family, his father having lived 5, his mother 94, and his sister 92, G. De Wolfe being the youngest of amily.

e was of good old revolutionary stock. mother was a Stanley and her father one of the Revolutionary patriots who e up his life for his country on board Jersey prison ship. Mr. De Wolfe's er, Levi De Wolfe, served six years in War of the Revolution and afterward ufactured scythes, etc.

r. De Wolfe worked at his trade in ri- and Plymouth until 31, then started e West Indies but the ship was driven its course and after a stormy voyage ded at Georgetown, Guiana, where abli-hed a gunsmith shop. The next returned, obtained a stock of guns, and went back, remaining through ber season. With the return of er weather, having disposed of his of guns, etc., he returned to New and was there engaged in the manu- re of mathematical instruments.

lis health becoming impaired he took ip to Buenos Ayres and from there on a whaler, taking the place of an etent blacksmith in the care of the and implements used in whaling. round Cape Horn. Returning in restored health he came was at Thomaston for the he rs

facture of rubber toys. From there he came to the rubbermill then running at Beacon Falls, where he remained a year. About that time Goodyear purchased a mill at New Brunswick, N. J., and induced Mr. De Wolfe to come there and take charge of the designing and construction of the machinery. After nearly two years there he returned to Beacon Falls, bringing his family to Seymour.

A. G. Day had then been in Seymour about a year, and while cleaning great quantities of rubber for use in other mills, was experimenting with a view to producing a reliable hard rubber compound. Mr. DeWolfe came to Seymour and while Mr. Day studied and experimented with various chemical combinations calculated to produced the desired results, Mr. De Wolfe planned and supervised the construction of the necessary machinery. From that time Mr. De Wolfe was for many years Mr. Day's able assistant. To him is due the perfecting of very valuable machinery for insulating all kinds of telegraph wire and ocean cables. This machinery was commenced in 1868, and has since been in constant stages of improvement, until it has at last been brought to practical perfection. To Mr. De Wolfe's steady and untiring industry in all these difficulties, chemical and mechanical, Mr. Day acknowledges himself more indebted than to any other one person, as well as for sustaining his courage and perseverance under difficulties and perplexities which seemed almost insurmountable.

Five daughters survive him, Mrs. W. Lea Roberts, Mrs. Mamie Barber and Mrs. W. R. Brixey of Seymour, Mrs. Nellie S. Jackson of Ansonia, and Mrs. Elimbeth Sears of Cleveland, Ohio.

The funeral will be attended from the house this afternoon, in charge of Under- taker Ward. Rev. R. B. Kimber will officiate. W. [illegible] and H. P. [illegible]

Kerite Insulation—
Your Cable's Best Life Insurance

DAYS KERITE

KERITE CABLE

Pacific Coast Representatives: *Carlo Baldassari, 582 Market St., San Francisco 4*
Robert A. Young & Co., 714 Olympic Blvd., Los Angeles 15

YOU CAN TELL INSTANTLY:

Wire Size: A different color for each size from No. 8 solid to No. 1000 MCM.

Characteristics: Code symbol quickly identifies whether connector is Standard, Nut Retainer, Plated, Long, Plated with Washers or with Spacer.

A NEW KYLE FIRST...the connector package that says... "HERE IT IS!"

Each LM Connector Package Fully Identifies Contents as to... Size... Characteristics... Wire Type.

Line Material Split-Bolt Connectors . . . in styles and sizes for every type of electrical connection . . . now come to you in a handsomely styled package so plainly marked as to take all the confusion out of stockkeeping.

Each package is plainly marked *on both ends* with a picture of the connector it contains, its characteristics and the sizes and types of wire for which it is designed. Each type and size of connector is designated by separate and distinctive color which adds to the convenience of selection.

For many years the industry has enjoyed such features of Line Material Split-Bolt Connectors as accurate machine-cut threads with no sharp edges . . . the high strength, free-running nut . . . the close-fitting pad with its rounded bearing surface . . . the ample open-end bevel for easy assembly . . . their clear markings for easy identification on the job.

NOW . . . add to this a packaging system of simple, positive, easy-to-understand markings to save time, eliminate waste and simplify stock taking . . . and these Kyle-made LM Split-Bolt Connectors offer service both in the field and in the stockroom that is outstanding.

Your Line Material Representative will be glad to give you full information on Line Material Split-Bolt Connectors to best meet your special line problems.

KYLE KC COMPANY SOUTH MILWAUKEE WISCONSIN

A DIVISION OF LM LINE MATERIAL COMPANY MILWAUKEE WISCONSIN

The Simplex-ANHYDROPRENE Cable shown is made up of three elements — conductor, insulation and jacket. The stranded conductor is copper, each wire coated with tin or an alloy. The insulation is Simplex - ANHYDREX, a low water absorption, insulating compound. The jacket or outer protection is a thin layer of a tough neoprene compound.

Cables of this simple construction may have solid or stranded conductors. They have no outer braids to rot or fray. They have excellent electrical stability and good aging properties. They resist deterioration by sunlight, heat, acids, oils and they will not support a flame.

Simplex-ANHYDROPRENE Cables are suitable for use in central stations as transformer or generator leads. They may be used for control or signal service. They may be racked on walls without conduit. They may be installed overhead on messenger or pulled into underground ducts.

For more detailed information ask for Bulletin No. 115.

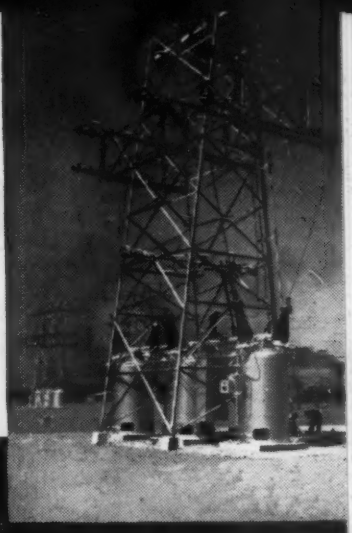
Simplex

WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

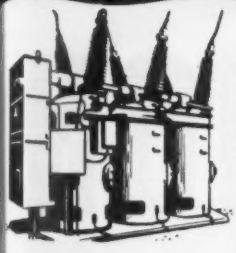
For HIGH-VOLTAGE SWITCHING EQUIPMENT

PROPERLY ENGINEERED for the JOB



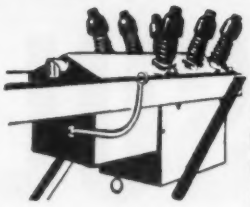
Call Pacific Electric

OIL CIRCUIT BREAKERS



TYPE RWE, 115 KV. ILLUSTRATED. Pacific outdoor Oil Circuit Breakers, 7.5 kv. to 287 kv., give superior service because of (1) exclusive Spring-Actuated Motor-Rewound Operating Mechanism, (2) highly effective Arc Extinguishing Device, and (3) ample dimensions, plus other features.

SERVICE RESTORERS

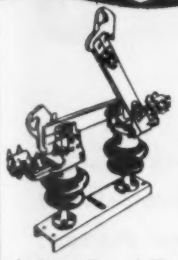


TYPE AP-40, MOTOR REWOUND ILLUSTRATED, 15 KV., 100 AMPS., CONTINUOUS; 2000 AMPS. INTERRUPTING RATING. Pole-top-mounted; automatic opening and reclosing eliminates outages caused by transient faults.

POLE-TOP SWITCHES

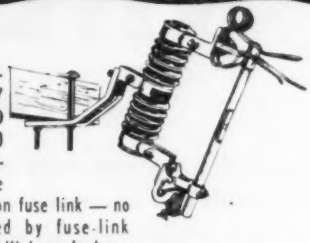
TYPE S, 46 KV., 600 AMPS. ILLUSTRATED. Made in 2- and 3-insulator types, these Pole-top Rocking-Insulator Switches, Type S, 7.5 to 46 kv., are Group Operated by control shaft mounted below pivot point counterbalancing the rocking insulator. Clamp-type terminals. Lockable hand-control mechanism.

DISCONNECTS



TYPE BB-1, 2000 AMPS., 23 KV., ILLUSTRATED. OTHER SIZES 400, 600 AND 1200 AMPS., TO 69 KV. These Outdoor Hook-operated Single-pole Disconnects have High-Unit-Pressure Contacts. Pry-off Safety Latch for easy operation, summer and winter. Rugged Blade Stops. Also available as double throw or transfer switches.

FUSE CUTOUTS

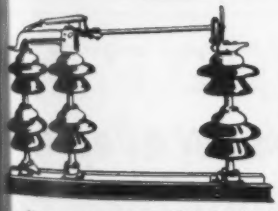


TYPE ET-3, DROP-OUT TYPE, 7.5/12.5Y KV., AND 15 KV., 100 AMPS., ILLUSTRATED. Have proper tension on fuse link — no outages caused by fuse-link breakage. Have High-grade Insulator, Solderless Connectors, Nonferrous Current-carrying Parts. Heavy Construction.

BUS FITTINGS

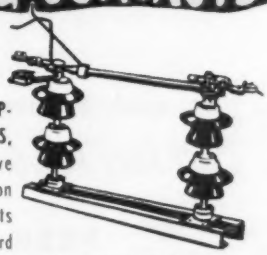
WIDE RANGE OF TYPES AND SIZES AVAILABLE. Made of Special Copper Alloy having high conductivity and resistance to weather. Careful workmanship.

SUBSTATION SWITCHES



TYPE TW, 7.5 TO 287 KV., OUTDOOR STATION AIR-BREAK SWITCHES. High-unit-pressure contacts. Rotating blade releases contact before blade opens. Applies contact pressure after blade reaches closed position.

ROLLING CONTACTS



TYPE YSW, GROUP-OPERATED AIR SWITCHES, 7.5 TO 115 KV. Have Solid Silver Inserts on Rolling-Disc Contacts and N.E.M.A. Standard Rotating Insulators. No flexible jumpers on these contacts. All nonferrous above insulator caps.

42 YEARS of SPECIALIZED EXPERIENCE

For 42 years the Pacific Electric Mfg. Corporation has specialized in the design and manufacture of high-voltage switching equipment from 7.5 kv. and up.

All through the years, repeat orders from power companies everywhere testify that this equipment is properly engineered for the job.

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Experienced IWI Field Service Representatives who talk your language are ready to serve you and help you without obligation.

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The IWI Blue Catalog lists hundreds of all the items you need every day, clearly listed, clearly priced. Every shop needs it. Write Los Angeles or San Francisco for your copy today!

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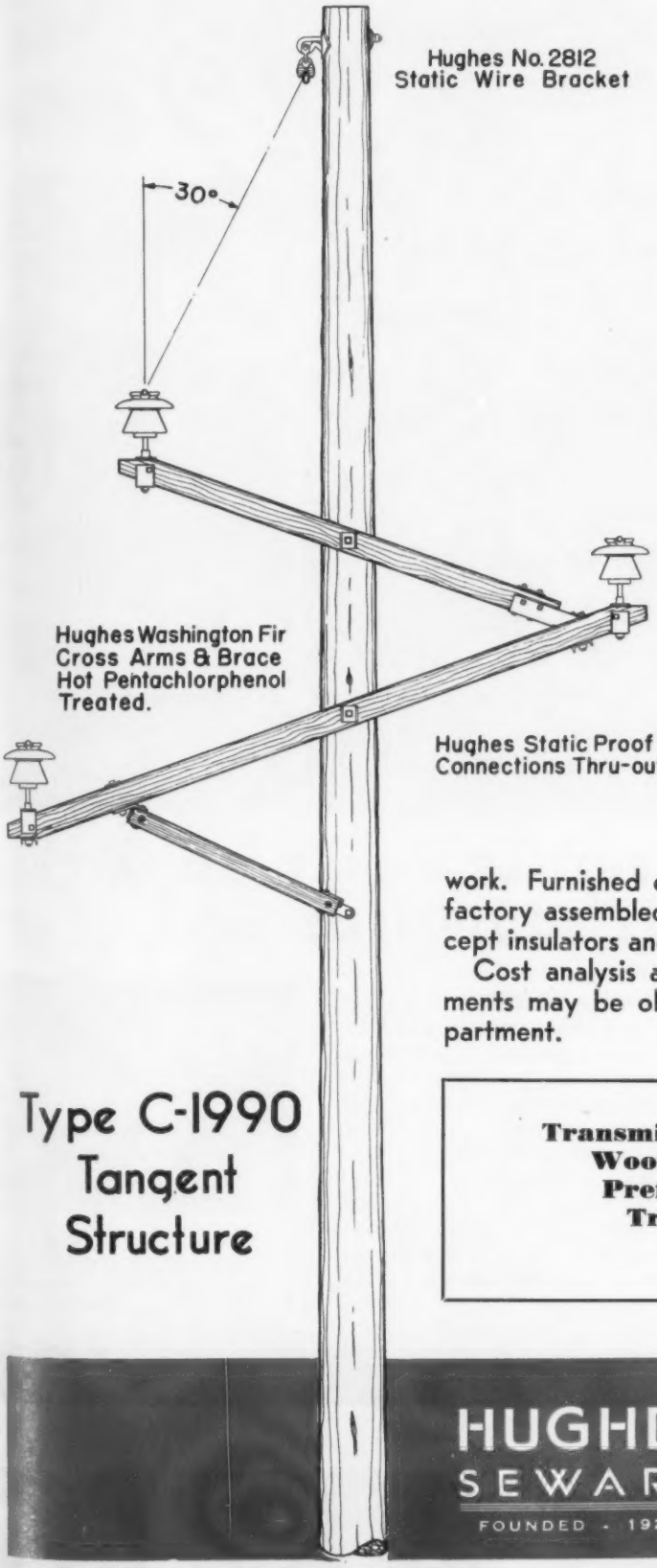
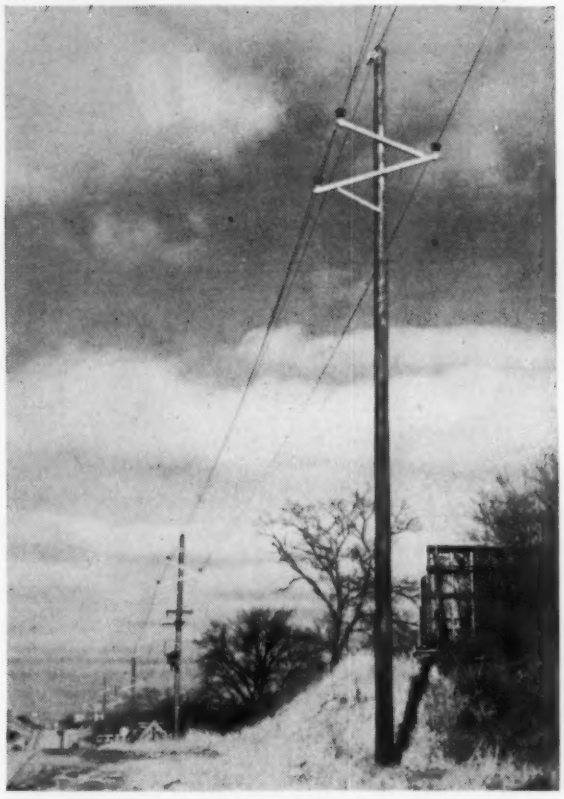
Wishbone Construction



Type C-1990
Tangent
Structure



Because of the excellent cone of protection provided by the shield wire, the offset conductors, clearance from conductor to pole or arm and because of its simplicity, Hughes Series C-1990 Wishbone Construction has recently become very popular with Engineers and Operating men thru-out the country. Comments from the field are very favorable particularly with reference to "Hot Line" work. Furnished complete for single or double arm construction, factory assembled with all necessary hardware for installation except insulators and insulator pins.

Cost analysis and scale drawings for your particular requirements may be obtained by consulting Hughes Engineering Department.

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Wood and Steel Switch Mountings
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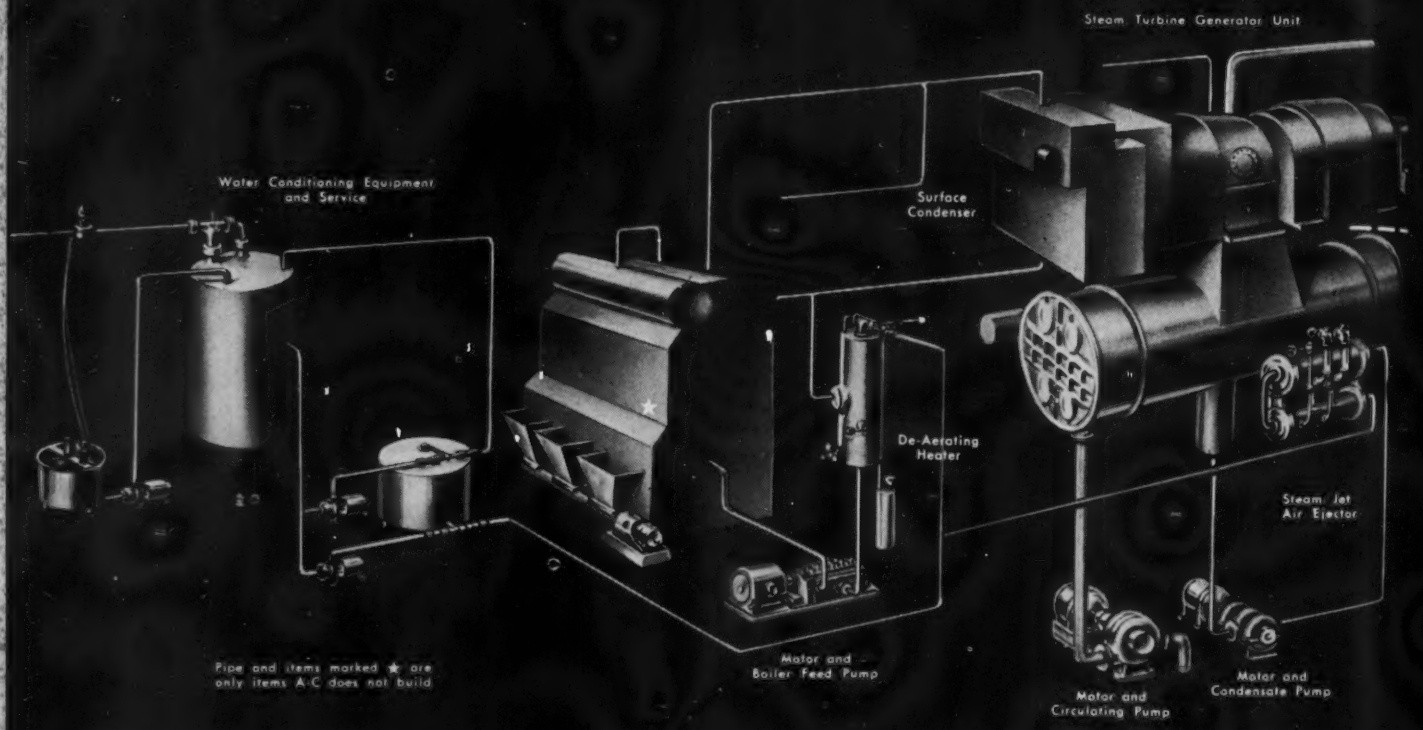
FOUNDED · 1921 INCORPORATED
"HUGHES" TRANSMISSION & DISTRIBUTION WOOD METAL MATERIAL MFRS.

Allis-Chalmers Builds for Progress i

LOOK AT LINE-U


Steam Turbine Generator Unit
Water Conditioning Equipment and Service
Surface Condenser
De-Aerating Heater
Steam Jet Air Ejector
Pipe and items marked ★ are only items A-C does not build
Motor and Boiler Feed Pump
Motor and Circulating Pump
Motor and Condensate Pump

AS YOU PLAN FOR FUTURE – CALL ON "A-C" COMPLETE-LINE EQUIPMENT AID

NEW POWER BULLETIN

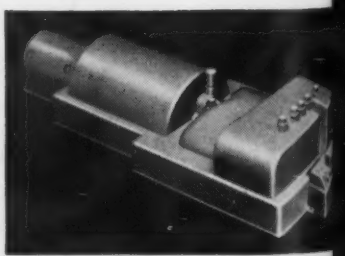
New 32 page bulletin 25B6150A covers all A-C products for power. Send for your copy today.

TO DATE, MILLIONS of dollars have been spent on improving and increasing our plant facilities. And many new production methods are going into use to build better products.

As your '48 plans for future expansion crystallize, our engineers will be ready with modern, up-to-date designs backed by experience gained in 100 years of service to industry.

Allis-Chalmers has literally "grown-up" with the Electric Power Industry, and has contributed many "firsts." Yes, look again at the power "line-up"—then, look to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2379



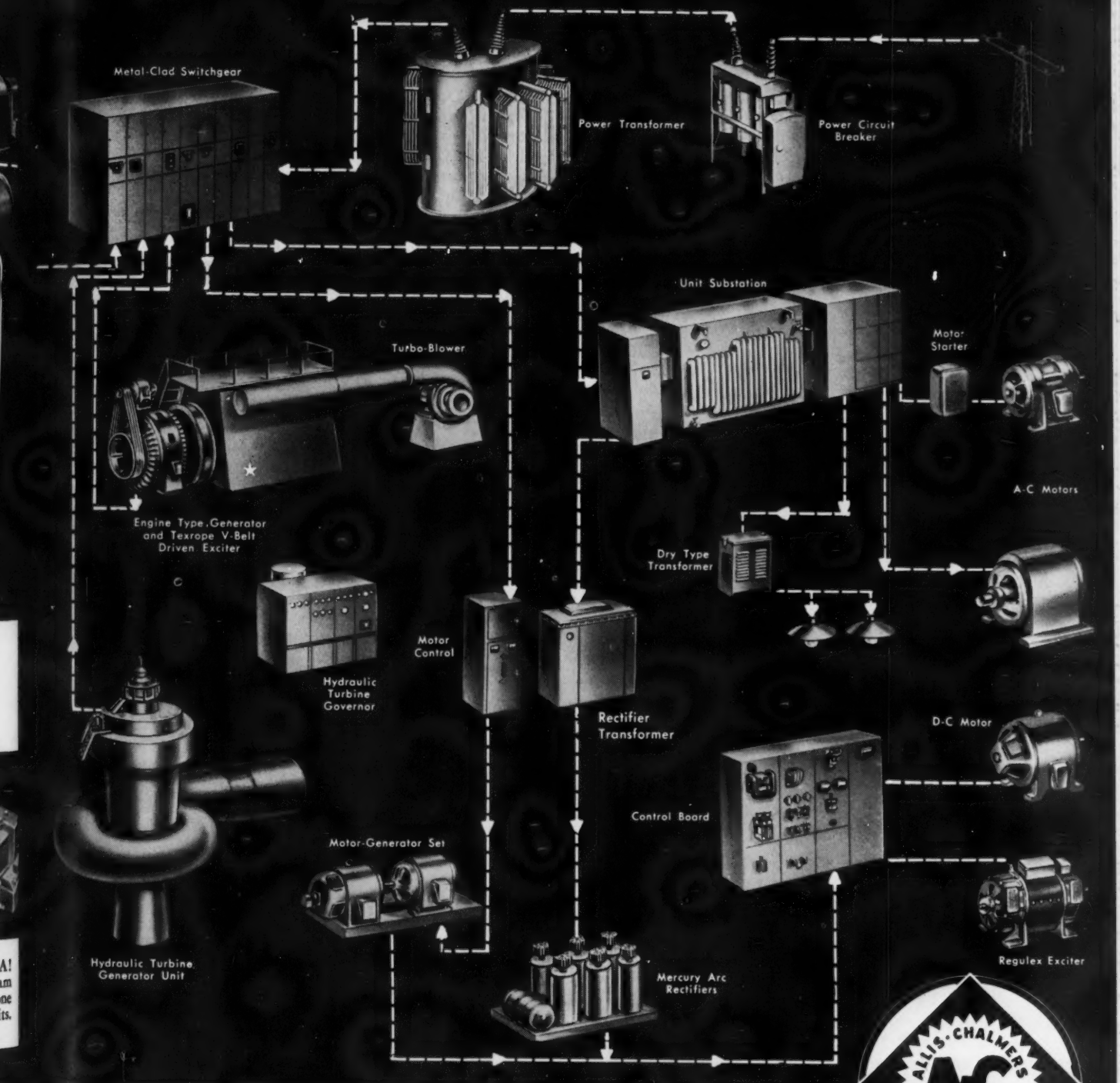
MORE POWER FOR USA! This new 20,000 kw steam turbine generator unit is one of A-C's standardized units.

Pioneers in Power and Electrical Equipment From Generation Through Utilization

ALLIS-

s in Electric Power–

-UP FOR '48!



ALLIS-CHALMERS A-C MILWAUKEE

S-CHALMERS

A "3E" ENGINEERED SPACE SAVER

The most serious problem on new or remodeled construction for electrical engineers and layout men is conservation of space. Regardless of the liberality of architects and structural engineers, there never seems to be enough room in power houses, substations, vaults and electrical structures to properly house equipment and still retain ample clearances. The ISOLATOR is an engineered space saver. A glance at the accompanying illustration tells the story.

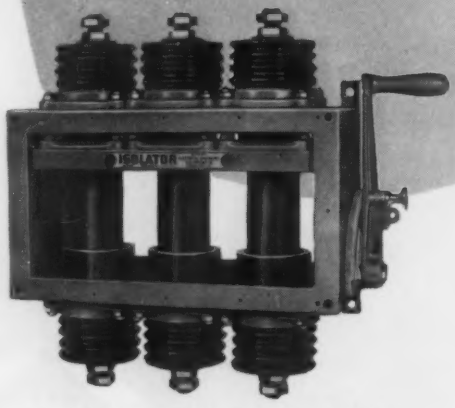
The ISOLATOR is especially adaptable to problems that involve the handling of lead covered cables and provide an excellent means of terminating and disconnecting cable. When so used it is called a CABLE ISOLATOR.

The unit consists of the ISOLATOR integral with a pothead body. The CABLE ISOLATOR'S compact dual unit construction eliminates the use of two separate pieces of equipment.

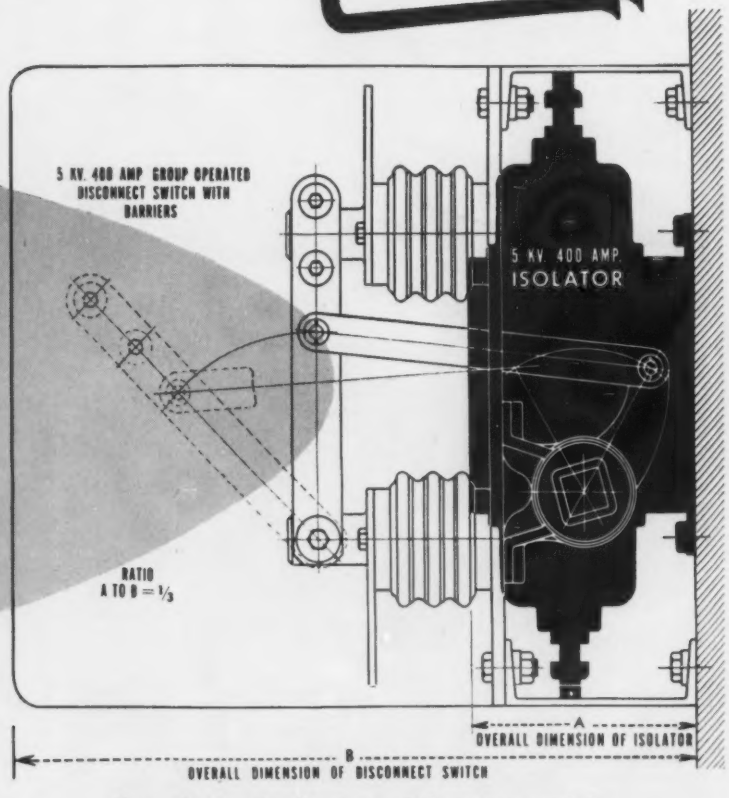
ISOLATORS are built for voltage ratings up to 15KV and for ampere ratings to 2000.

YOU CAN DO IT BETTER WITH AN ISOLATOR

3. P.S.T. 200 ampere 7.5 KV Cable ISOLATOR with smoking pipe shape body.



3. P.S.T. 600 ampere 7.5 KV ISOLATOR


5 KV. 400 AMP GROUP OPERATED DISCONNECT SWITCH WITH BARRIERS
5 KV. 400 AMP. ISOLATOR
RATIO A TO B = 1/3
A
OVERALL DIMENSION OF ISOLATOR
B
OVERALL DIMENSION OF DISCONNECT SWITCH

Above phantom drawing shows relative space occupied by ISOLATOR in contrast with switch of same rating.

SPACE SAVING IS ONLY ONE ADVANTAGE GAINED BY USING ISOLATORS. THERE ARE MANY OTHERS.

Get the complete ISOLATOR story in Bulletin 135

THREE E — ELECTRICAL ENGINEERS EQUIPMENT CO. — MELROSE PARK ILLINOIS

WITH

CENTRAL SPANG CONDUIT

You're sure of..

EASY BENDING

Any old timer will tell you that Central Rigid Steel Conduit has always been famous for its excellent bending properties. It gets that way because it is made from carefully selected steel that's as ductile as it is strong.

You'll find that most sizes of Central Conduit are easy-to-bend with an ordinary hickey. And when bent, it will not crack, crush or ripple . . . or damage its protective coating in any way.

Central Conduit is handled by a distributor near you. When you call him he will do everything he can to make deliveries as quickly as possible in spite of today's unprecedented demand.

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Division of The National Supply Company

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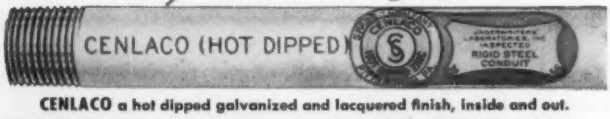
There's Tested Strength in Every Length..

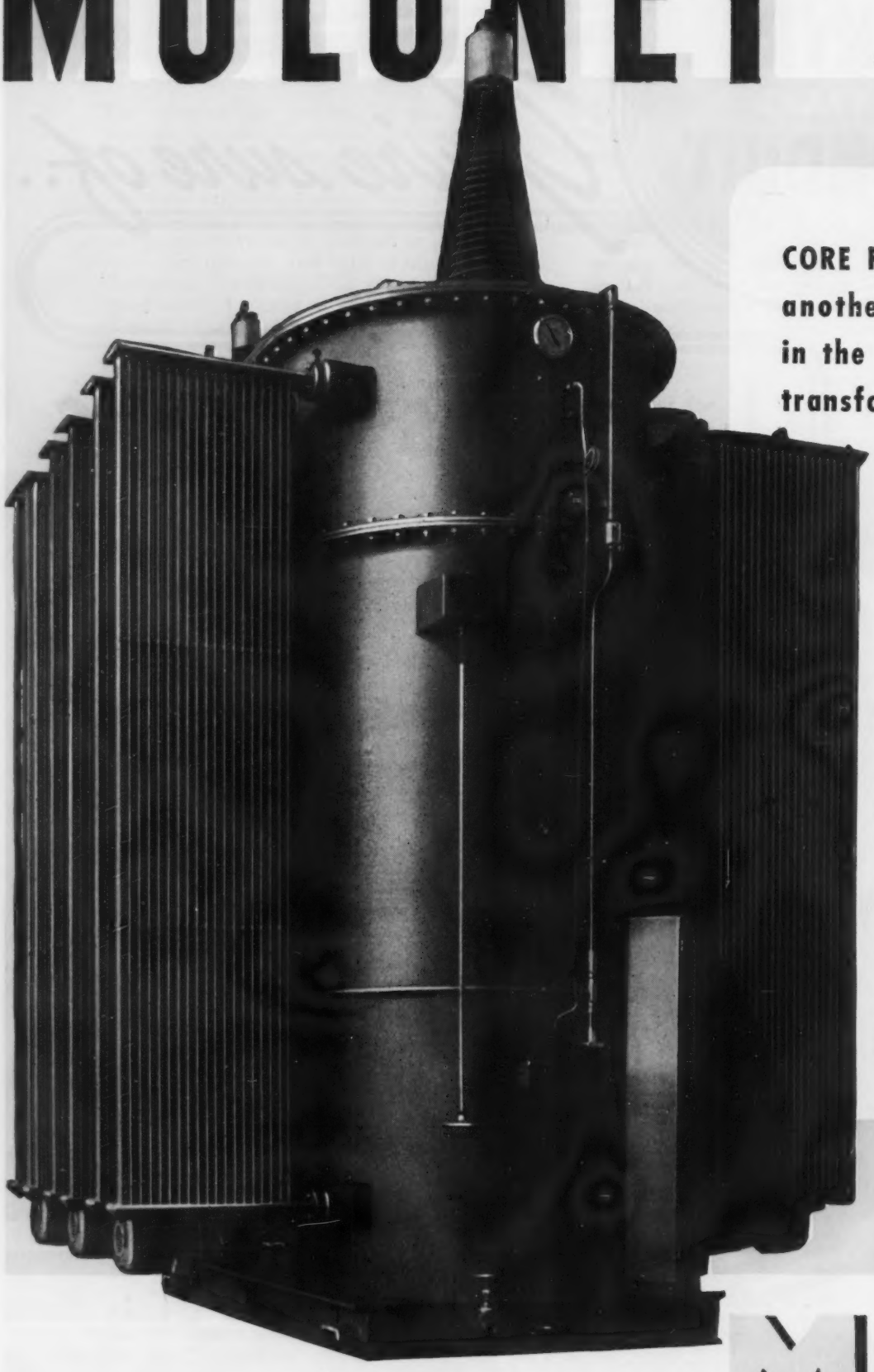


CENLACO a hot dipped galvanized and lacquered finish, inside and out.

CENTRAL WHITE electro-galvanized outside and black enameled inside.

CENTRAL BLACK permanent, baked-on black enamel finish, inside and out.

MOLONEY TR



CORE FABRICATION . . . another important phase in the manufacture of transformers

Skillful processing of materials and use of specialized production facilities are vitally important factors affecting on-the-job transformer performance. Many of the important details of construction necessary to the proper performance of a transformer are hidden from view when the transformer is assembled. Among these details are those involved in the fabrication of the core. The special attention paid to the cutting, annealing and assembly of cores contribute to the *plus* performance and extra dependability of Moloney Transformers.

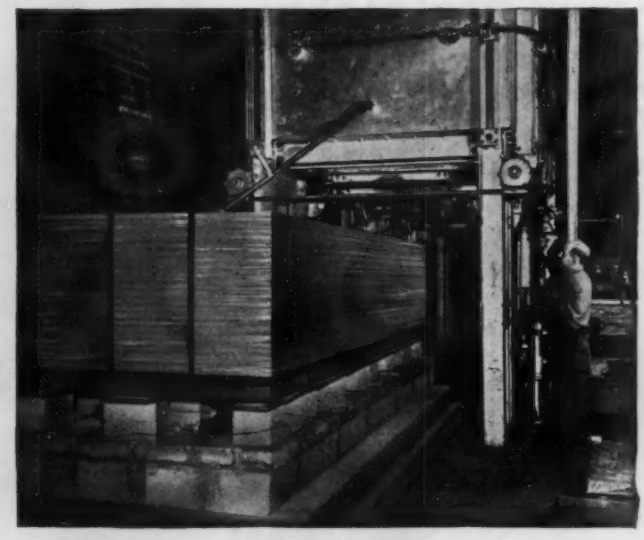
MOL

POWER AND DISTRIBUTION TRANSFORMERS SINCE 189 F

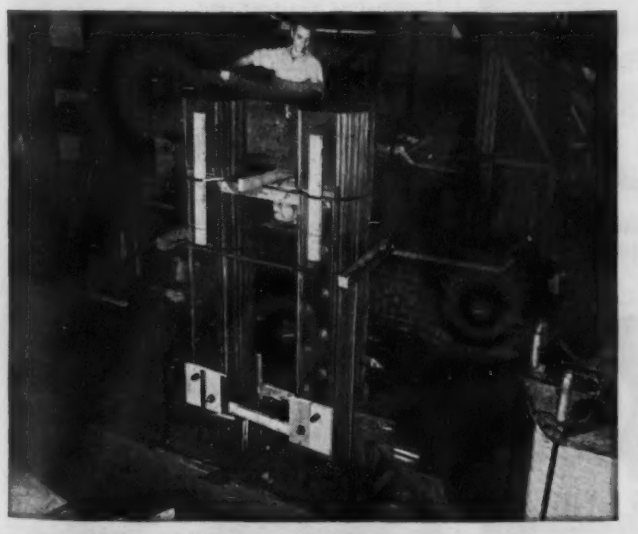
PRINT IN BINDING

RANSFORMERS

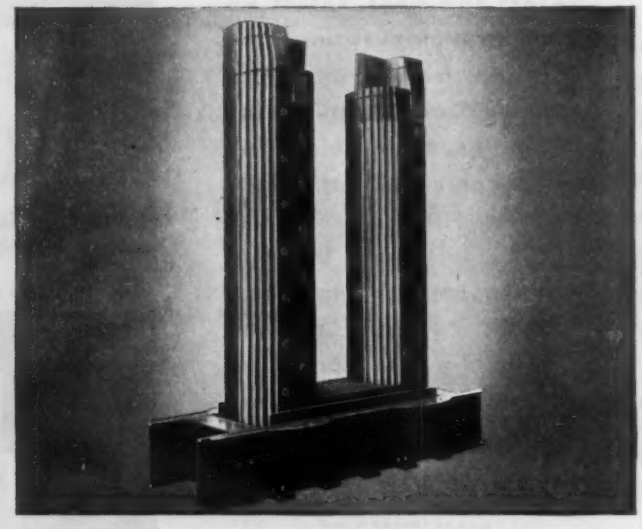
CUTTING: Burred edges of laminations, caused by improper cutting, may result in abnormally high core loss through short circuiting when cores are stacked. Through careful cutting with sharp shears this contribution to core loss is materially reduced. Also mechanical stresses, a contributing factor to increased hysteresis losses, are greatly reduced by sharp shearing of the laminations. Core laminations for large transformers are drilled or punched after cutting so that they may be bolted together for greater mechanical strength.



ANNEALING: Stresses resulting from the shearing operation are relieved by annealing. The annealing process also provides an oxide coating which insulates the laminations from each other . . . an important factor in the reduction of eddy current losses. Automatically regulated overhead ovens maintain correct temperatures for annealing . . . thus assuring proper performance of the cores.



CORE ASSEMBLY: After the laminations are annealed, core legs are stacked and bolted. Extra core lamination insulation and core-cooling oil ducts are added to reduce inter-lamination resistance and eliminate possible hot spot sources. Core bolts are provided with insulating sleeves to prevent short circuiting of the laminations. After stacking, the legs are set upright and the bottom cross laminations are placed into position as shown in photo. Care is exercised to prevent "air-gaps" at the joints between edges of the cross laminations and leg laminations, to keep exciting current at a minimum.



ASSEMBLED CORE: Here we see a core assembled ready for placing windings. The laminations have been properly cut to avoid abnormally high core losses . . . proper annealing has further relieved stresses and oxidized the laminations for insulation and reduction of losses . . . the laminations have been insulated, stacked and provided with core-cooling oil ducts. The core has been carefully assembled to eliminate "air-gaps" at joints and the bottom clamping structure has been installed. The core is now ready to receive the transformer windings.

ELECTRIC COMPANY

FACTORIES AT SAINT LOUIS, MISSOURI, AND TORONTO, ONTARIO, CANADA

APPROVED • NEATER • FASTER • STRONGER •

use BRIEGEL ALL-STEEL INDENTER-TYPE fittings

Select the best, insist on Briegel All Steel Fittings, the only approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers—more profits from each job!

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All B-M Fittings Carry the Underwriters Seal of Approval

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GALVA, ILLINOIS

LETTERS TO THE EDITOR

To the Editor:

It has been with a high degree of interest that I have read the recent article in *Electrical World* dealing with the attitude of Electrical Engineering graduates towards the power companies. Likewise, I have found the editorial published in ELECTRICAL WEST to be a timely one. Since this subject has caused me no small amount of concern, I am taking this means of thanking your organization for its interest and effort in this subject.

At this time, I wish also to present a point of view regarding this subject which arises out of the subject matter contained in the article, *Lighting Experts vs. Buyer's Desires* (ELECTRICAL WEST, December 1941). As you may recall, this treatise mentioned that there were five types of people who were consumers of lighting. The characteristics of the first four of these groups may be given somewhat as follows:

Muscular Man is evolving a perfect body. He expresses himself through *physical action.* He finds employment as a manual laborer, a "strong" man, as a dancer, etc.

Material Man remembers. He finds employment as a tradesman, an accountant, a lawyer, a banker, a storekeeper, a surgeon, as a salesman, an operator of a machine, etc.

Mental-Physical Man reasons. He finds expression as a mechanical engineer, a physician, a manufacturer, a transportation executive, a secretary, etc.

Mental Man imagines. As a consequence, he is a designer, an electrical engineer, an illuminating engineer, etc.

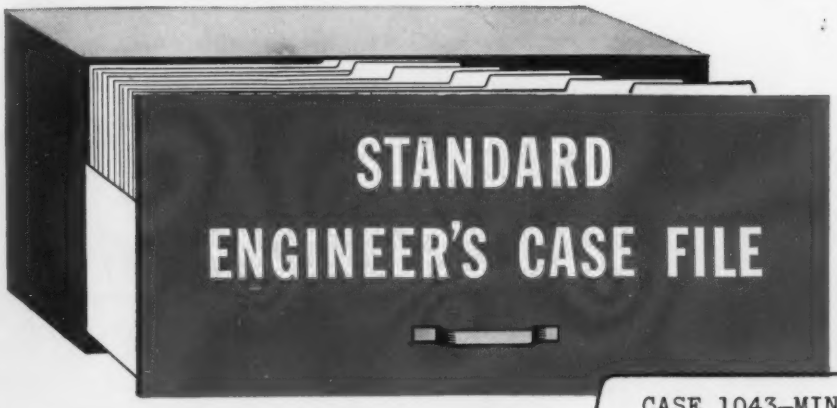
. . . In other words, power company management is usually of the material group—which *remembers.* It thinks in terms of merchandise, sales records, rate structures, budgets, sales programs, etc. Often these items are quite without regard for the needs of the field they are supposed to serve. Neither do they present a logical approach to the immediate problem. Once a precedent is established, strict adherence is made to the established line of thought.

With this attitude prevailing, it is not possible for this management to have a high regard for subjective matters. Since illumination is of the latter order, it cannot understand the function or purpose of illuminating engineering, or comprehend just how the illuminating engineer can be of value as a load builder . . .

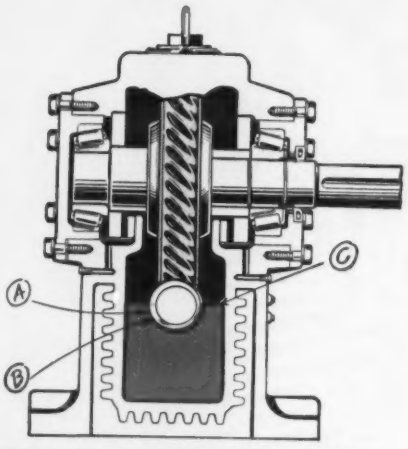
Thus, the solution to the power company problem is not likely to be found in an appeal to the existing management. To effect improvement, it will be necessary to first provide a type of management which can understand the current (subjective) problems.

As a means of illustrating the point being made, I shall make reference to a similar condition found in the field of politics. As is well known, a change in leadership is a *must* when the mass consciousness of a people has made a degree of progress. Before that stage has been reached, the change is unwelcome and usually impossible. Thus, in the earlier part of our civilization, *muscular man* gave us a tribal economy. When sufficient progress had been made to require a different way of life, material man gave us an era of kings, with its corresponding property rights, slaves, tradesmen, laws, cere-

(Continued on Page 46)



CASE 1043—MINIMIZING LEAKAGE IN LARGE ENCLOSED GEAR SETS.



AIR-COOLED WORM GEAR SPEED REDUCER

In heavy-duty industrial enclosed reduction gears the relatively high viscosity characteristics of Calol Gear Compound cut consumption. Efficient in both conventional and worm types and where such gears carry extra loads or are worn. Comes in eight grades: 60, 100, 120, 135, 150, 190, 225 and 410.

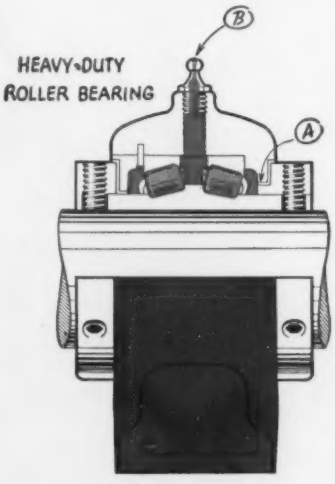
A. Oiliness and extreme pressure additives cushion shocks, prevent vibration, welding and extra wear.

B. Non-corrosive - will not harm bearing or gear metals.

C. Contains effective foam inhibitor - breaks bubbles that form and stops building up of pressure in case.

Calol Gear Compound resists high temperatures and retains good body in all operating conditions. Its numerous viscosity grades make it adaptable to a wide range of applications and conditions.

CASE 1065—SECURING POSITIVE BEARING LUBRICATION IN HIGH RADIATED TEMPERATURES.



Calol S. A. Grease stopped leakage and drippage trouble in a large roller bearing even when bearing temperature, due to radiated heat, reached 250°F. and over. Originally developed for heavy-duty anti-friction bearings, but adaptable to many industrial grease-lubrication services where high ambient temperatures exist. Comes in three grades: No. 00, No. 0 and No. 1.

Has sodium-aluminum soap base - feeds evenly through bearings ... oil stock selected for high heat-resistant qualities.

A. Minimizes seepage through housings and seals.

B. Resists cold temperatures - pumpability remains good in all weather.

Calol S.A. Grease has proved excellent for low-, medium-, and high-speed anti-friction bearings. It is packed in 35-, 108- and 420-pound containers.

Trademarks, "Calol," "RPM," Reg. U. S. Pat. Off.

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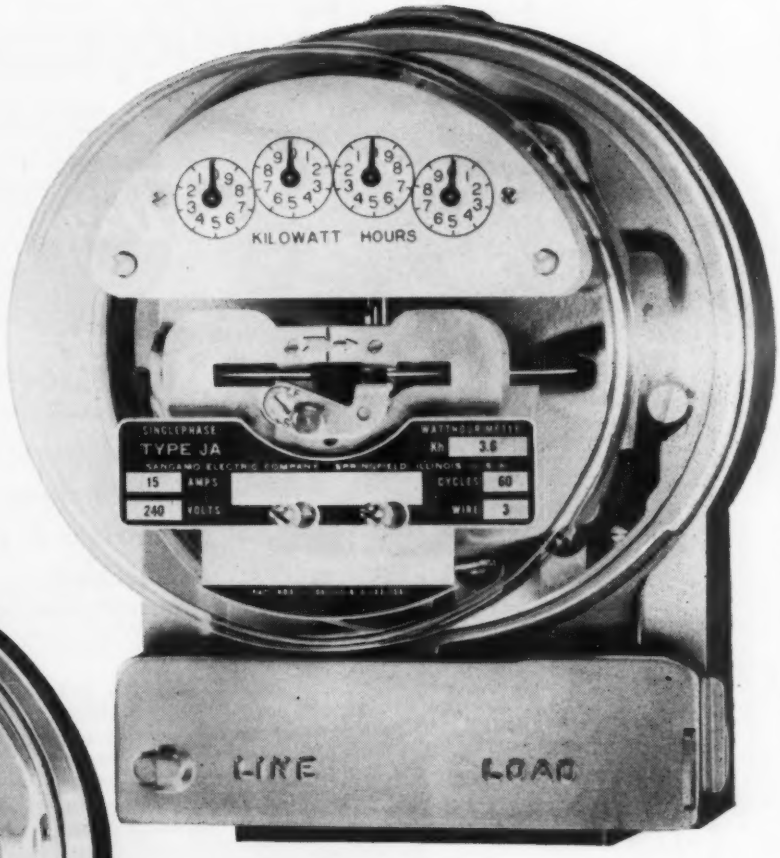
"ON MEASUREMENT IS FOUNDED
THE WHOLE PROGRESS OF MAN . . ."

...is Measured so Accurately as

ELECTRIC ENERGY

...and the name SANGAMO on a meter has become a synonym for Accurate Measurement...



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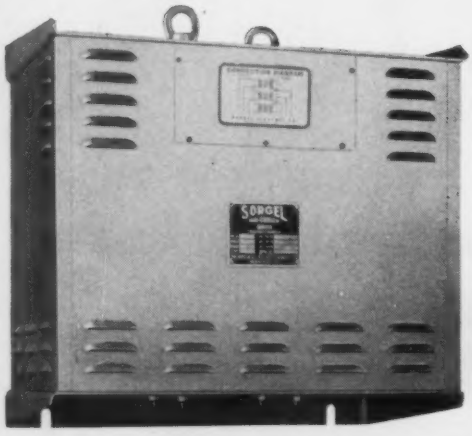

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Leaders— with the latest improvements and refinements.

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Pioneers in the development and manufacturing of Air-Cooled transformers.

(Continued from Page 42)

monies, farming, weaving, etc. When mental-physical man had made several contributions, as the steam engine, the power loom, large water wheels, etc., it again became necessary that a new way of life be adopted. Due to the fact that these contrivances (the mechanical age and mass effort) required a large investment, the banker became the head of this new era which was called a "democracy" (?). Of recent years (since 1860), mental man had been making a number of acceptable contributions which are affecting our way of life considerably, as electricity, electronics, aviation, radio, radar, synthetics, plastics, social security, unemployment insurance, rationing, price control, illumination, etc. . . .

Since the above analogy is treated more fully in my book, *Lighting To Stimulate People*, which will be off the press in about another month, a brief outline is included in this letter . . .

J. Lloyd Kamm
Palouse, Wash.

To the Editor:

Your article *That Salesman Is Here Again* under Electra's Husband brought to mind a similar experience in my home several years ago. We had a —— "three-wheeled" vacuum cleaner which was only a year old. One day a —— salesman with tank-type cleaner appeared at our home and sold my wife on the idea that the ——— would ruin our rugs. She invited him back to see me that evening. When he came, I informed him that he would be wasting his time to give a further demonstration but he kept insisting so I agreed to let him attempt to prove that his cleaner was better. . . .

Fortunately for me I had sold vacuum cleaners to the public several years previous to that time and knew some of the tricks in the trade. This salesman pulled the usual stunts which the uninitiated would accept without much argument. For example he picked up a round ball perhaps three-fourths of an inch in diameter and asked me if I could do that with our cleaner. I informed him that I could but also that if there were any marbles or balls lying around we would certainly want to pick them up instead of putting them into the vacuum cleaner. The salesman finally decided that our cleaner had all the advantages of his cleaner with the exception that his cleaner had an air filter. My argument for this point was that if I had $80 to spend, I would put an air filter on the furnace in order to filter the air 24 hours a day instead of just filtering a little bit of the air during the short time each week that the vacuum cleaner was in service.

I believe that the time was well spent because now, 17 years later, we still have the same old cleaner and I have never had to repeat a similar demonstration.

Of course, I am getting away from the purpose of your article which was to show that salesmen will again be required when production catches up with demand. It is already apparent that this is happening in some lines such as radio and it is likely to happen in several other fields before long.

I enjoy your articles in Electrical West and since you may wonder at times if anyone reads them, let alone enjoy them, I thought I would take this opportunity to let you know that your efforts are appreciated. If you need any of the tricks of the trade to forestall purchasing a new vacuum cleaner, please drop me a line—your wife will love me for it.

R. C. Setterstrom
Montana Power Co.
Butte, Mont.

When sleet, wind, flood or fire interrupts your service, Graybar knows you must have replacement items *fast*. Graybar has outstanding facilities for delivering them wherever and whenever you need them.

Our nation-wide network of nearly 100 supply stations (warehouses and offices staffed with experienced personnel) provides broad accessibility to stocks of essential pole-line supplies. Our long-established relationships with select manufacturers assure their extraordinary co-operation in filling extraordinary needs.

Our experience in hundreds of power-and-light emergencies gives us the know-how for immediate action and efficient follow-through.

Ever since the first distribution line was erected, power companies have been finding Graybar* service invaluable in emergencies . . . plenty helpful, too, in meeting everyday requirements. *Graybar Electric Company, Inc. Executive offices: Graybar Building, New York 17, N. Y.*

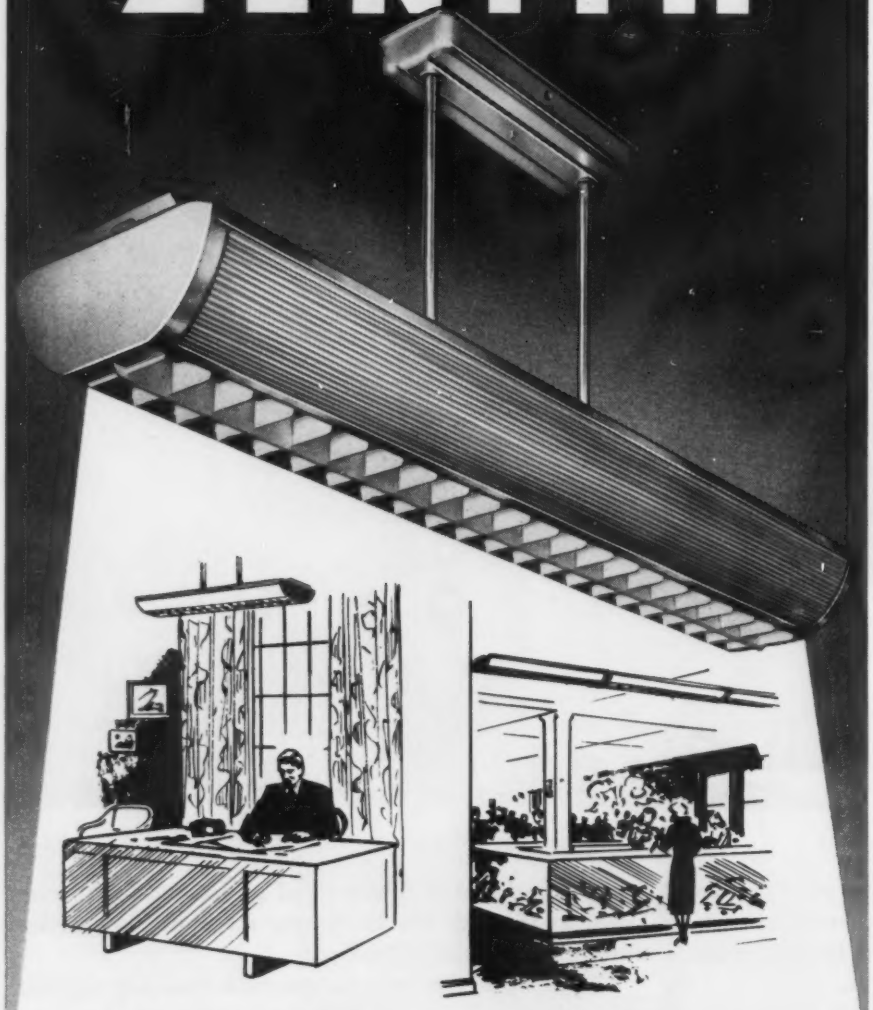
**Prior to 1926, Western Electric Supply Dept.* 4818

Everything for your Pole Lines via Graybar

CALL OUR NEAREST OFFICE: Boise, Butte, Denver, Eugene, Fresno, Los Angeles, Oakland, Phoenix, Portland, Sacramento, Salt Lake City, San Diego, San Francisco, Seattle, Spokane, Tacoma.

Planned Lighting with

ZENITH



OFFICES . . . STORES

Here's a commercial fluorescent luminaire that's engineered for superlative lighting performance—yet costs only a very little more than conventional equipment. Precision formed on precision tools, the Zenith installs easily, services quickly. Polystyrene plastic side panels are light, strong and shatterproof. The shielding unit controls the light for greatest effectiveness, with a minimum of of surface brightness. The Zenith may be installed individually as shown, or in continuous mounting.

Write for the new Zenith catalog sheet

Offices in Principal Western Cities

SMOOT-HOLMAN COMPANY
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

Branch and Warehouse in San Francisco

FOR THE BEST IN INDOOR AND OUTDOOR LIGHTING IT'S SMOOT-HOLMAN

PRODUCT NEWS

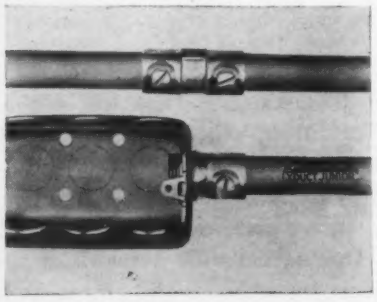
Contactors (200)

Allis-Chalmers has added to its line of contactors 1,500-, 3,000- and 6,000-amp. units for operation on up to 750 volts d-c. They are single pole, heavy duty, magnetically operated, frame mounted, rear connected, with up to eight heavy-duty, normally open or normally closed, double-break auxiliary interlock contacts. The main contacts are designed with arc tips which force the arc out onto the ribs of the arc runners. The arc chute has a divider to help cool the arc. All parts, including the main and auxiliary contacts, are readily accessible, according to the manufacturer.

Distribution Capacitor (201)

A 25-kvar. individual distribution capacitor announced by Westinghouse is said to have a lower weight per kvar. than existing 15-kvar. units. Similar in design and dimensions to present Westinghouse 15-kvar. units, the 25-kvar. capacitors are 66 2/3% greater in capacity with weight increase and volume increase of only 50%, the manufacturer states. They mount in standard one-, two-, or four-unit racks of the same size as furnished for the 15-kvar. units. They are available for the usual distribution voltages from 2,400 volts delta or 4,160 Y to 7,960 delta or 13,800 Y.

Connectors (202)



National Electric Products Corp. is offering a new line of pressed steel connectors and couplings designed for use with electrical metallic tubing. The line has an electro-galvanized finish. The coupling is shown at top and a typical installation below. Positioning of the conduit is controlled by a small integral stop. Holding action of both items is the same. Gripping is by the action of an embedding screw working through a boss. When the screw head is driven down to rest on the boss, the tip of the screw becomes embedded in the tubing wall. Approved by Underwriters' Laboratories.

Terminal Block (203)

Curtis Development & Mfg. Co. has announced a terminal block featuring a lock-in arrangement said to eliminate danger of spade lugs pulling out. This block has solder-type spade lugs recessed into the body. When the binder screws are tightened, each lug is held in place against a shoulder of plastic material. This block is factory assembled in any desired number of terminals from 1 to 18.

Why you get Maximum Horsepower with PELTON Hydraulic Turbines

Buckets with central dividing splitters—the original discovery of Pelton—develop more horsepower from a given quantity of water. More horsepower spins larger electric generators and produces lower-cost kilowatts.

All through the 65 years of peace and war since this Pelton discovery, electric companies have relied upon Pelton Turbines and water-control equipment for utmost efficiency and reliability.

Constant Pelton research and improvements set today's standards for impulse turbines throughout the world.

PELTON Impulse Turbines are made from a fractional horsepower to 70,000 horsepower and more. Pelton Reaction Turbines are also made in a wide range of sizes including 55,000 horsepower and more. They are likewise used in gigantic electric power projects.

Such hydraulic turbines, together with huge water-discharge valves and pressure-regulating devices to control turbines, demonstrate the engineering achievements and manufacturing facilities of the Pelton Water Wheel Company.

BLW THE BALDWIN GROUP

The **PELTON WATER WHEEL Company**

A Subsidiary of the Baldwin Locomotive Works

2929 NINETEENTH STREET SAN FRANCISCO 10, CALIF.

What's new in

street lighting

SODIUM LAMP LIFE EXTENDED 33%

A new cathode extends the life of G-E sodium lamps under normal service to 4000 hours—at no increase in price. Under continuous operation, the new lamp is rated at 8000 hours. Less servicing and fewer lamp replacements make modern sodium lighting, with its distinctive safety color, more economical than ever.

Here are 10 developments

for better lighting at lower cost in 1948

These are important tools for your 1948 street-lighting program. They are the significant improvements which General Electric made in lighting equipment during 1947.

While each of these developments was announced in this magazine during the past year, may we suggest that you review them again? They represent 10 opportunities for you to get better lighting at lower cost. If there are any that you want to know more about, please call or write us.

NEW INSULATOR REPLACES FIVE DESIGNS

The new Form 45H7 insulator for series street-lighting circuits supersedes, and is interchangeable with all five older 45H designs, thus reducing inventories. Such features as higher flashover and a reinforced lip make this a better, stronger insulator. Price remains the same.

REPLACEMENT GLASSWARE AT 1¢ PER MONTH

Recently completed data covering a 10-year period show just how economical spun-sealed optical assemblies are. The average cost to all users—for new glassware and complete reconditioning of reflectors—is only 1¢ per luminaire per month. The highest reported is under 2¢. And all users have lower cleaning costs, higher light efficiency.

IMPROVED STREET-LIGHTING PROTECTOR

The Type J-1 protector for series lighting circuits is easier to install, more positive and dependable in operation. All parts are more accessible. Protector is now single-bolt mounted. Time-lag adjustment is more sensitive and the sealed circuit breaker, with its heavy-duty contacts, needs no maintenance.

NEW HOOD HAS 3 BIG ADVANTAGES FOR SUBURBAN LIGHTING

The new Form 107 Hood—for suburban and radial-wave reflectors—permits higher mounting; simplifies wiring; and gives positive maintenance of proper light distribution. Reflectors attach directly to hood. Uses easily wired slip-fitter mounting. (Also available top-tapped to replace Form 45L.) Natural-finish die-cast aluminum.

MERCURY LAMP LIFE NOW RATED 6000 HOURS

Life rating of the 400-watt Types B-H1 and F-H1 mercury lamp, in practical use for 12 years, has recently been increased 20 per cent. Users can now expect a full year and a half of service, on the average, from this lamp (6000 hours with 10 burning hours per start), with no change in rated efficiency throughout life. Price remains the same.

41% MORE ILLUMINATION FROM 15,000 LUMEN LAMPS

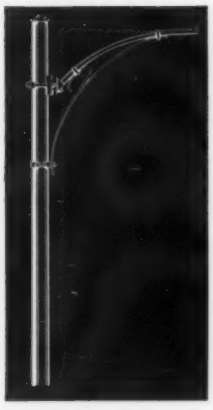
A new luminaire for 15,000 lumen filament or 400-watt mercury lamps, gives the highest utilization efficiency yet achieved for wide streets. By actual test, this luminaire, with its HOLOPHANE refractor, puts 41 per cent more light on the roadway than the widely used deflector type of luminaire.

2 NEW SUBURBAN REFLECTORS FOR INTERSECTIONS

Added to the line of high-efficiency, low-cost equipment for residential street lighting are two new enclosed, spun-sealed optical units. The new Type CR utilizes a HOLOPHANE offset 4-way refractor to distribute light down all four streets permitting mounting on a short bracket. Type CS uses a rippled globe, produces symmetrical light distribution.

A DEMONSTRATION KIT CALLED 30-STREETS-IN-ONE

Here is the equipment that will help you demonstrate and sell better street lighting more economically. With it, 30 different ways of lighting a street can be shown, with foot-candle values ranging from 0.02 to 0.87, with old types of equipment and the latest in open, enclosed, sodium, and mercury luminaires. Cost, installed, runs about $6000.



UPSWEEP BRACKET NOW MADE FOR STEEL POLES

This attractive, new-style G-E upsweep street-lighting bracket permits dual use of steel poles—especially existing tubular trolley poles. It permits high mounting of luminaires, is easy to wire. Available in 4-, 6-, and 8-ft lengths, for poles from three to nine inches in diameter. Takes slip-fitter or top-tapped hoods.

GOOD STREET LIGHTING BUILDS GOOD WILL

These are the latest of many developments which General Electric has pioneered to help you provide better street lighting at lower cost. More are on the way. Watch for the announcements. For full information on any item, call our nearest office or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

452-64

IT'S YOUR MOVE...

Send today for your free copy of the Pedigree Insulating Varnish catalog, then use it in selecting the exact material for nearly every requirement. It's filled with helpful information and descriptions of many different Pedigree Varnishes, each a favorite because of its outstanding performance. If your problem necessitates the formulation of a special varnish, the Pedigree Industrial Laboratory is at your disposal.

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Plastic Clam

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plastic cable
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Liquid-Level Indicator (204)

A magnetic-type instrument for liquid-level indications on transformers is announced by Westinghouse. This instrument has bright yellow hands and numerals and blue-grey background for high visual contrast; a weatherproof dial assembly to eliminate fogging due to breathing and condensation under glass. It consists of two separate, independently replaceable assemblies, each oil tight and weatherproof. The bezel or outer assembly includes the calibrated dial and indicating needle which is directly mounted on a shaft carrying a powerful magnet. The body is a sealed unit enclosing another powerful magnet directly coupled through a shaft to the float arm. Any motion of the float arm rotates the body magnet which in turn displaces the bezel magnet and indicating needle. The instrument can be furnished with an alarm contact for low-level indication whenever the fluid falls below a predetermined level.

Transformers (205)

A new line of machine tool transformers has been announced by General Electric. The line includes ten ratings ranging from .075 to 3 kva. for use on 60-cycle circuits of either 220 or 440 volts. For 25-cycle applications, four sizes from .150 to .500 kva. are listed, with primary voltage taps for 220, 440 and 550 volts. An all-purpose group is rated for both 50- and 60-cycle supply, the primary is equipped with eight voltage taps ranging from 208 to 550 volts, and standard 110-volt secondaries have 92-volt taps with operation of 60-cycle relays on 50-cycle circuits.

Transformer Relief Device (206)

Westinghouse has a transformer mechanical relief device claimed to vent transformer pressures from electric arcs or overloads more quickly and effectively than devices depending upon rupturing of a diaphragm. This device is designed to fit any transformer with a 9-in. handhole opening; adapters may be used for larger openings. A roller latching arrangement locks the vent until the predetermined pressure is reached. The device can be set for 10 lb. per square inch and tripping takes place within one-half pound pressure of this setting. A dome over the opening prevents rain from entering the transformer.

F Lamp Capacitors (207)

A new series of capacitors for fluorescent lamp fixtures is available from Solar Capacitor Sales Corp. Type FF condensers come in three ratings for 118, 208 or 236 volts, 50-60 cycles a-c, and are claimed to give 85% power factor or better for all fixtures. Underwriters' listed.

Amplidyne Control Unit (208)

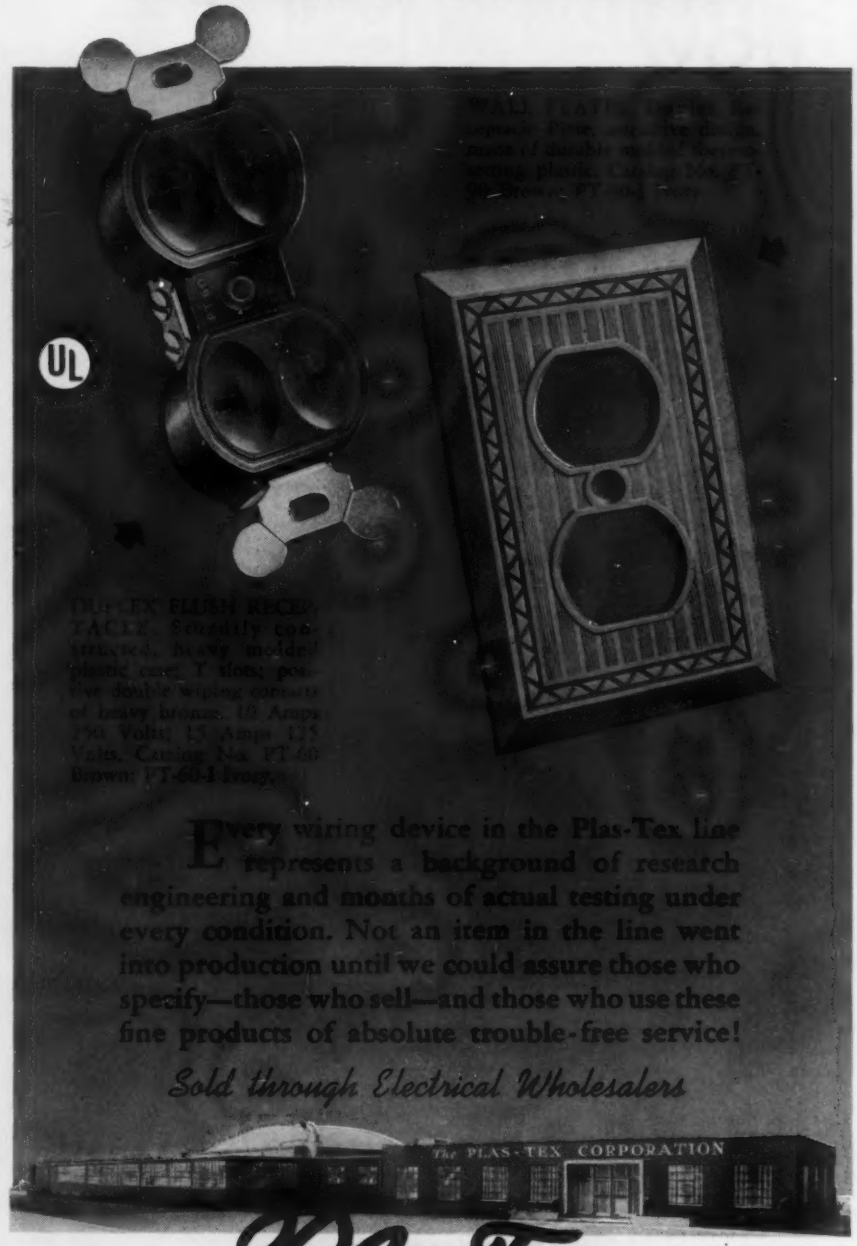
G-E has a packaged amplidyne control unit for use on steel mill and similar mill and processing line control applications. It brings together in one 18x12x11-in. package all the adjusting rheostats, capacitors, rectifiers and instruments required for the amplidyne regulating circuit.

Plastic Clamps (209)

American Molded Products Co. is offering plastic cable clamps in three sizes: ⅜ in., ½ in. and ⅝ in.

for Quality..Satisfaction

Specify PLAS-TEX WIRING DEVICES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Every wiring device in the Plas-Tex line represents a background of research engineering and months of actual testing under every condition. Not an item in the line went into production until we could assure those who specify—those who sell—and those who use these fine products of absolute trouble-free service!
Sold through Electrical Wholesalers
The PLAS-TEX CORPORATION

THE Plas-Tex CORPORATION

2525 MILITARY AVENUE, POST OFFICE BOX F, LOS ANGELES 25, CALIFORNIA

Check the date.
For "the Show" of '48

SECOND ANNUAL INDUSTRIAL ELECTRICAL . . . SHOW . . .

MARCH 18-19-20, 1948

at

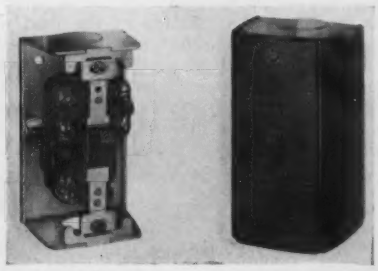
THE LOS ANGELES ARMORY

See you there!

Sponsored by
The Electrical Maintenance Engineers Association of Southern California, Inc.

Snap Switch (210)

Allen-Bradley is offering the new Bulletin 600 manually operated snap switch for starting motors of 1 hp. or less. It has a molded plastic cover, an overload device which operates on the soldered ratchet principle. According to the announcement, it is impossible to hold the switch closed under sustained overload but it can be easily reset, with the regular switch lever, after the overload is cleared. This switch can be furnished without enclosure for mounting in a standard switch box or machine base. Various types of enclosures are also available.

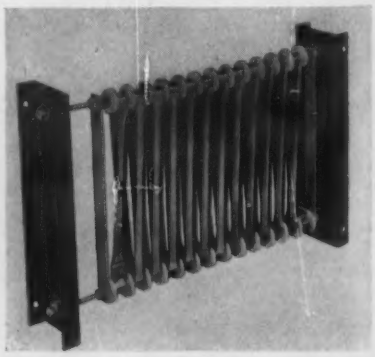


Airbreak Switches (211)

The Hi-Voltage Equipment Co. has a new line of Type A-W airbreak switches, superseding its Type S-W. Intended primarily for line sectionalizing and substation work, these switches are available in ratings from 7,500 to 46,000 volts and 400 to 1,200 amp. Upright, underhung or vertical mounting is provided, and operating mechanism is arranged for requirements of manual or motor operation.

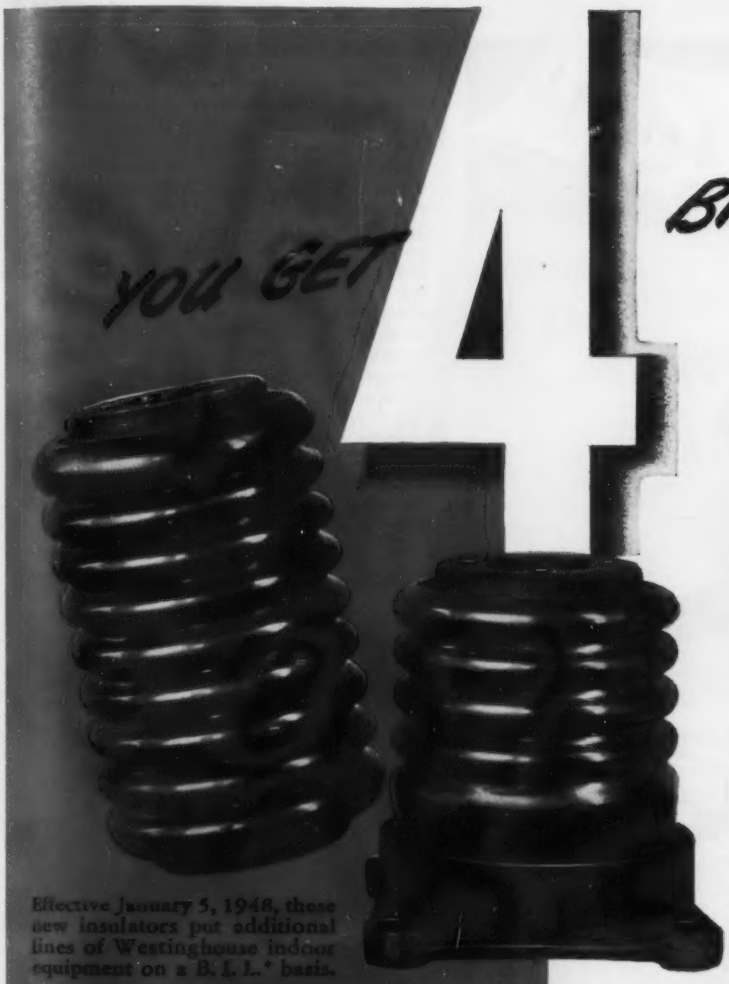
Resistors (212)

Ward Leonard has developed Loopohm resistors for continuous-duty high-current applications where mechanical shock and vibration prevail. They are available for continuous-current capacities from 20 to 110 amp. and with a wide range of resistance values. When required they can be furnished with tapered current capacities, fixed or adjustable clamp taps, end frames and expanded or sheet metal enclosures.

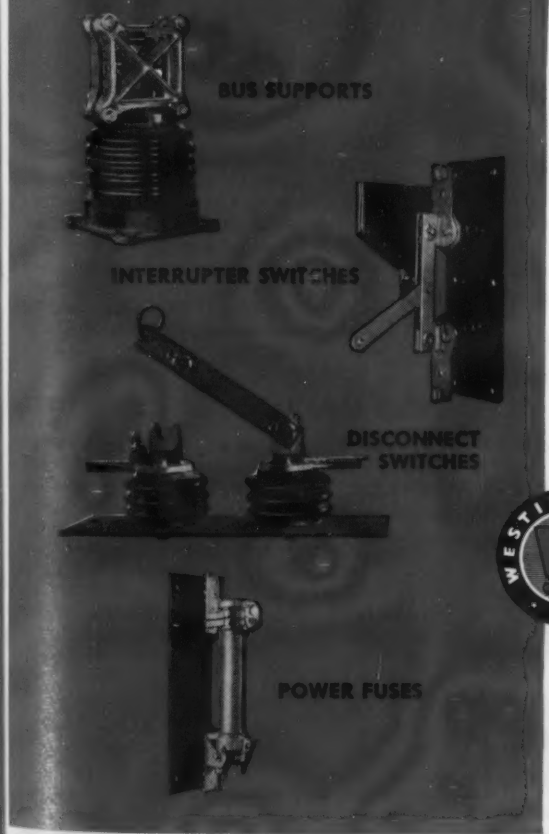


Air Circuit Breaker (213)

An air circuit breaker for use on circuits 600 volts and below has been announced by G-E, as Type AK-1. AK-1-15 is rated 15 to 225 amp. with a 15,000-amp. interrupting rating. AK-1-25 is rated 35 to 600 amp. with a 25,000-amp. interrupting rating. This breaker can be supplied either for individual mounting or as an integral part of draw-out switchgear equipments. It is available for electrical or manual operation.



Effective January 5, 1948, these new insulators put additional lines of Westinghouse indoor equipment on a B. I. L.* basis.



with

NEW WESTINGHOUSE B. I. L.*

INDOOR INSULATORS

In designing this completely new line of indoor insulators, Westinghouse creates important benefits for you. Meeting all new B.I.L. requirements, established by AIEE-EEI, these insulators promise big savings in maintenance and replacement stock costs . . . new flexibility in application with fewer types.

Westinghouse Disconnect Switches, Fuses and Bus Supports mounted on these standardized insulators now can be applied on the same impulse withstand levels as switchgear, transformers and other high-voltage equipment. When so applied—either with new equipment or as replacements—they provide these 4 advantages.

1. They meet B.I.L. withstand values.
2. They provide equipment that is co-ordinated with B.I.L. outdoor equipment.
3. Five strength classes now do the job of eight former classes.
4. Standardized heights and diameters facilitate interchangeability.

For complete information on devices equipped with these new insulators call your Westinghouse representative or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

*Basic Impulse Insulation Level.

J-60659

DISTRIBUTION APPARATUS

Made in the WEST for the WEST by

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

For more than 45 years the famous STEPHENS Climbers have been exclusively manufactured by

Buckingham
of Binghamton

and in that time one objective has been constantly kept in mind—to maintain the same high quality standards established by Wilmot Stephens when he first forged climbers on a blacksmith's anvil almost a half century ago.

Extreme care is taken to provide safe, comfortable equipment, and every article is inspected to comply with the exacting requirements established by safety engineers.

Buckingham "Cushion Deluxe" Floating Tool Belt No. 58 is made from the best latigo and chrome leathers. It has the "rolled edge" feature that gives a cushion effect with the greatest comfort to the wearer. Rigidly tested for strength and safety.

Here's Why Buckingham Climbers are Safer — More Comfortable!

- Shank a perfect fit, shaped for comfort.
- Wide standing surface slightly rounded to fit foot.
- Round loop will not cut straps.
- Gaff is hammer-forged from special tool steel, set straight with body of climber and close to foot-piece, giving least strain to climber, and maximum comfort to lineman.
- Each climber tested for toughness and strength of gaff rivet.
- Each climber Parkerized (rust proofed) and lacquered.

BUCKINGHAM MANUFACTURING CO., INC.

Walter E. Craw, President — 5-7 Travis Street, Binghamton, N. Y.

See your distributor . . . now more than 400 outlets handling Buckingham equipment.

Cushion Mounting (214)

A new cushioned mounting for the porcelain in Allis-Chalmers through-type current transformers serves as insulation for the one-turn primary in the unit. The one-piece porcelain is suspended inside the transformer housing by two continuous circular wedge-shaped rubber gaskets held in place by clamping rings which maintain even pressure on the flexible gaskets and primary bushing. Space between the secondary winding and enclosing case is filled with an elastic compound said to seal out air and moisture and eliminate any tendency toward restricted breathing under temperature changes. Available in current ratings above 1,000 amp. and voltages up to and including the 34-5-kv. class, they are supplied in the circular window type for slipping over the primary bus structure or with the primary bar as an integral part of the porcelain and equipped with terminals for bolting in the primary circuit.

Television Capacitor (215)

Cornell-Dubilier has introduced Type TMC-187 capacitor for television applications. This tubular capacitor is in a rating of .005 mfd. 3,500 VDC working in dimensions of 1⅛ in. in diameter and 1¾ in. in length. It is also available in both single and dual capacities and other voltage ratings with small physical dimensions.

Ceiling Receptacles (216)

Slater Electric Mfg. Co. has announced new keyless ceiling receptacles in ivory bakelite for use with 3¼- and 4-in. round boxes. They are designed with extra strong terminals, according to the manufacturer, and take No. 10 aluminum wire or No. 12 copper wire, using large binding head screws. These receptacles have an average of ½ in. oversize on outside edges. They come complete with washer head screws and mounting, 660-250 volt. Underwriters' approved.

Black Light Units (217)

Keese Engineering Co. is offering two new black light tubular units in 15 and 30 watts, with hard glass filter. The 360/BL tubes are said to have 2,000-hour life. Units are supplied with hanging hooks, loops, 6-ft. cords, plugs and automatic starters. Finish is a bank bronze, light hammertone. Designed for installation in continuous rows for mural lighting or singly for individual paintings, etc.

Slimline Fixture (218)

Frink Corp. has a 97-in. Series 32 slimline fixture available with either two or four lamps for 100-, 200- or 300-milliamp operation. It features glass slide panels and interchangeable hinged louver and glass door bottoms.

it's new!
RoFlex

Rome's "easy to work" NON-METALLIC SHEATHED CABLE

EASY TO STRIP... LIGHT WEIGHT... SAVES TIME...

Further evidence of Rome Cable's ever broadening service to the electrical industry is RoFlex . . . the *new and better* thermoplastic insulated non-metallic sheathed cable. This latest addition to the "Rome" line now enables the wholesaler and contractor to specify "Rome" for his entire building wire needs.

RoFlex . . . meets all requirements of the man on the job. It is easy to strip, light weight, uniformly small in diameter, and clean to handle . . . the kind of cable the electrician calls "easy to work." Further, step by step, it is constructed for low-cost and trouble free installation.

FOR EXAMPLE:

1 The thermoplastic insulated conductors strip easily leaving bright, clean copper for quick connection. The insulation is highly resistant to oils, acids, moisture and flame . . . is permanently colored for quick and easy circuit identification.

2 A spiral wrap of specially treated paper covering each conductor provides light-weight, durable protection against mechanical injury . . . yet, strips back easily.

3 Impregnated jute fillers in each valley give the finished cable increased longitudinal strength, and serve as a "rip-cord" for stripping the outer braid.

4 The outer cotton braid is flame and moisture resistant. The uniformly small diameter saves space in outlet boxes and fits smaller holes.

Add them all up, and you have a cable that is easy to handle and quick to install . . . the result is savings for you. Remember the name . . . RoFlex.

UNDERWRITERS' APPROVED

Underwriters' approved for 60°C operation under the '47 National Electrical Code.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

Pacific Coast Agents
PACIFIC ELECTRO SALES, INC.

LOS ANGELES 13, CALIF.
340 Azusa Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
1054 Fourth Ave., So.

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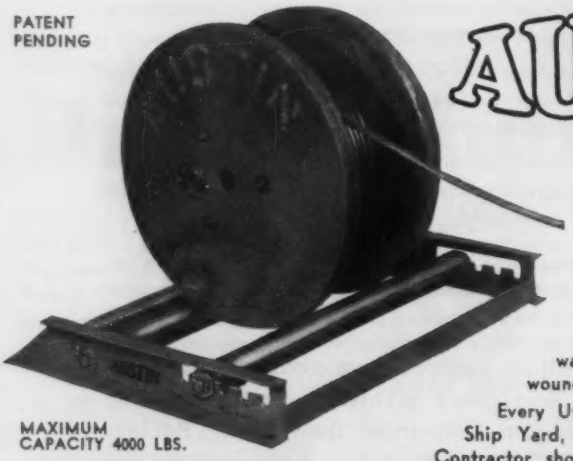
LINE EQUIPMENT

Sales Offices and Warehouses
SAN FRANCISCO LOS ANGELES
PORTLAND SEATTLE

PATENT PENDING



AUSTIN

NO. 600 REEL ROLLER

MAXIMUM CAPACITY 4000 LBS.

A new quick, easy, safe way to dispense any material wound on a reel.

Every Utility, R. E. A. Cooperative, Ship Yard, Railroad, Wholesaler and Contractor should have several AUSTIN REEL ROLLERS. When pulling one or more cables into conduit use an AUSTIN REEL ROLLER for each cable. Can be mounted stationary or used on the job as a portable device—ideal for service and repair trucks.

9 OUTSTANDING ADVANTAGES

(1) Ramp—makes it quick, easy and safe to load the reel.
(2) Back roller is slightly higher, preventing the reel from being pulled off the roller when cable is removed.
(3) Reel rolls on grease packed flanged ball bearings with the greatest of ease and safety. No backlash.
(4) Thumb screw, which when tightened, prevents roller from turning for easy and safe removal of reel.
(5) Leg screw hole in each corner for stationary mounting. Hole in each side for bolting rollers together.
(6) Heavy steel frame, painted bright orange, not only adds to its appearance, but, also, makes it readily visible on the floor, which helps to eliminate accidents.
(7) Five adjustable slots to take various reel diameters. No screws, washers or cotter pins to remove—simply raise up the roller and slide into the slot required.
(8) Will take any reel up to 80" in width. For larger reels, use two reel rollers and bolt together end to end.
(9) Can be used in the warehouse, on the job or truck.

PRICE $37.50 EA. NET
2% CASH 10 DAYS F.O.B. CHICAGO, ILL.
Order from Your Electrical Wholesaler

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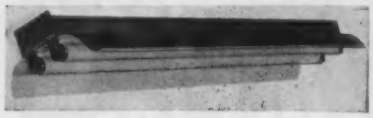
F Industrial Unit (219)

Mitchell Mfg. Co. has a new all-purpose industrial fluorescent unit, Model 2098. It uses two 40-watt lamps. Reflector is 11 in. wide, finished in hard, glossy baked white enamel. Luminaire operates on 110-125 volts, 60 cycles a-c.



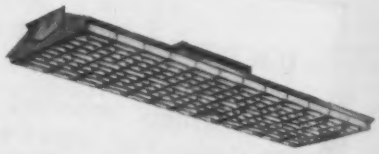
Slimline Ballasts (220)

G-E has two groups of ballasts for Slimline fluorescent lamps in single-lamp and Tulamp high-power factor designs and operating at 120 and 300 ma. Also introduced recently are new single-lamp and Tulamp ballasts for cold-cathode lamps. These are of a high-power factor design and enclosed in a brick-type case; are designed to operate the 72T8 and the 96T8 lamps at 120 ma.

Island Light (221)

Silv-A-King Bright Light Reflector Co. has developed the all-purpose island light with a base-up lamp. This unit features a wiring trough with lamp holders to make it adaptable to auxiliary lighting services, such as advertising displays, building illumination, approach lighting.

Fluorescent Fixture (222)



Smithcraft's new fluorescent fixture, the Dayliter, is a shallow, louvered unit for two 40-watt lamps. The fixture was designed to provide more light in the work zone and a feature is a louver giving cutoff from lamp glare of 40° crosswise and 30° lengthwise. It may be mounted individually or continuously; flush to the ceiling or hung on a special stem set.

F Lampholder (223)

Sylvania has improved its medium combination lampholder for fluorescent fixtures. Feature of the new design is in the small, rectangular insulating cover used on the bottom of the combination starter base. A locking ear tab has been added to automatically hold the terminal screw cover in place when once inserted. This permits the operator to drop the nut in the slot in the front of the lampholder and use a ⅝-in. mounting screw to fasten the device to the fixture.

It's good electrical practice...

to provide ample capacity for present and future needs on distribution systems, service equipment, switches, circuit breakers and other plant electrical equipment

It's good Electrical Practice...

to protect general service light and industrial power circuits with Trumbull "AT" Enclosed Circuit Breakers. A completely enclosed, non-tamperable unit, designed to replace fuses, fused switches and other circuit protection, this device requires no element to renew after circuit interruption.

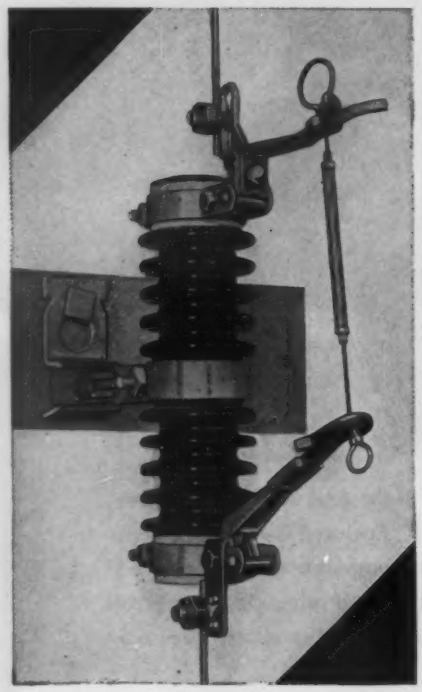
"AT" Circuit Breakers have adequate wiring space (plenty of room for pulling wires and making connections) . . . liberal number of knockouts, cleanly cut and readily removable . . . semi-dust type construction with felt gasket and a screw on front with provision for sealing . . . also available in cast enclosures for explosion proof and water and dust tight applications . . . locking shelf for 3 padlocks in either the "on" or "off" position. Flexible engaging mechanism eliminates possibility of handle breakage.

It's also good practice to specify Trumbull, the make that protects *your* safe practice, for any of the following equipment – safety switches, switchboards, panelboards, motor controls, control centers, circuit breakers, L.V.D. Busways and FLEX-A-POWER branch feeders. THE TRUMBULL ELECTRIC MANUFACTURING CO., Plainville, Conn. Other factories at Norwood, Ohio, San Francisco, Seattle, N. Hollywood. Sales offices and representatives in all important cities.

MEN WHO OBSERVE THE BEST PRACTICES MAKE IT A PRACTICE TO USE TRUMBULL

TRUMBULL ELECTRIC

MATTHEWS PROTECTOLINK CUTOUTS



Efficient protection at low cost is provided in these ruggedly constructed open link type cutouts. Protectolink fuse links are designed so they cannot be installed upside down and design of contact arms permits ease of fuse link installation. The spring tensioned lower arm automatically seats fuse link contacts into contact recesses in the arms, thereby assuring positive and radio noiseproof contacts. Matthews Protectolink Cutouts and Fuse Links are interchangeably adaptable with all other makes. Rated 50 amperes current carrying capacity and 5 Kv., 7.5/12.5 KV. Grd. Y and 15 KV. voltage ratings.

Write for Bulletin 101-A

W. N. MATTHEWS CORP.
3722 FOREST PARK BLVD.
ST. LOUIS 8, MO.

BULLETINS ETC.

Capacitors (224)

A revised line of a-c- motor starting electrolytic capacitors and of Superex paper capacitors for capacitor-type motors and power factor improvement of small induction motors, is shown in Catalog Bulletin AC-1 available from Solar Capacitor Sales Corp.

Connector Selector (225)

Burndy is offering a "Connector Selector" indexing terminals, taps, T-connectors and splices. Ordering information is given for every connector.

Voltage Regulators (226)

Allis-Chalmers outdoor, self-cooled, 3-phase, 60-cycle, Type AFR feeder voltage regulators, built in standard ratings of ±10% load ratio control in 32⅝% steps, are described in a new 24-page bulletin released by the company.

Underground Construction (227)

Construction material for underground distribution systems is treated in Bulletin No. 46031 recently published by Line Material Co. The 74-page catalog describes and pictures the equipment.

Display Lighting (228)

Day-Brite Lighting Inc. has issued a display lighting bulletin, No. 40-B, superseding all listings carried in No. 12 and 114.

S-Polymers (229)

S-Polymers, new resins for application where low-moisture permeability is desired, are discussed in Bulletin E-401, issued by Griffin Chemical Co. A table of physical properties, solubility, stability and processing applications of types S-50 and S-60 polymers is included.

Wires and Cables (230)

In a handy thumb-indexed bulletin, Simplex gives non-technical descriptions of some of its wire and cables. Each product is illustrated and a wire and cable selector is included in the final pages.

Store Lighting (231)

An Edwin F. Guth bulletin describes new store lighting equipment, including show window and wall case units and Hy-Liters for accent lighting.

Resistors, Rheostats (232)

Ward Leonard Electric Co. has published Catalog D-30, which describes and illustrates its line of stock units in resistors, rheostats, and radio amateur relays.

Transformers (233)

Construction, operation and application of Allis-Chalmers transformers is described in a new 24-page bulletin released by the company.

Capacitor Catalog (234)

Cornell-Dubilier's Catalog 200 lists its complete capacitor line and offers ordering service. More than 20 classes of capacitors are described and pictured.

Lightning Arrester (235)

Line Material Co. has a new booklet on its Type DL lightning arrester.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
Please send me information about following CIRCLED items:

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232	233	234	235				

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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Cut a piece of bethanized strand and the enlarged cross-section tells you an interesting story. To illustrate it, we show here unetched sections of three bethanized* zinc-jacketed wires—one with an "A" coating, one with "B" coating, one with "C."

Photos of the three magnifications show the uniform coating-thickness of each type. No thick spots here and thin ones there. *Uniform* protection around the entire circumference of each wire. This is something you can depend upon in bethanized strand.

The uniform coating is but one of the many advantages of bethanized strand. Another is the high ductility of the coating—a feature that enables the zinc armor to resist cracking and flaking even under severe, repeated bending. We will be glad to explain the complete story of bethanized strand. Call the nearest Bethlehem Pacific sales office.

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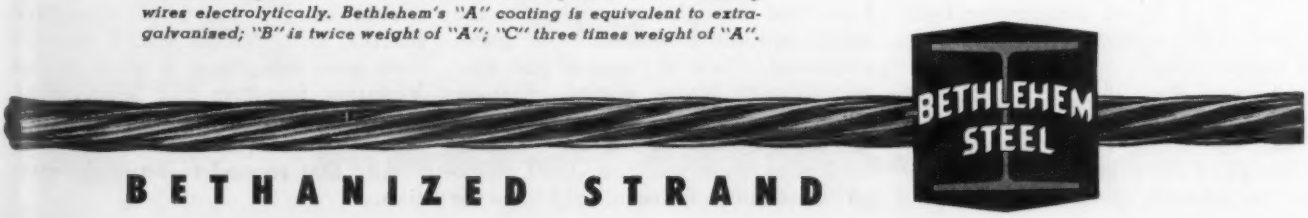


ELECTRA'S HUSBAND

Old Light and The New Look

"THERE you go again, spoiling a perfectly good effect I've worked so hard to obtain," Electra said one night recently as I snapped the dining room wall switch and flooded the room with light. Five 75-watt lamps in a center fixture will do just that, especially as compared with the illumination from eight or ten candles.

"Don't chide him," one of our dinner guests said. "This is one place where I really enjoy my dinner, principally because I can see what I am eating instead of depending upon taste or smell to tell me. Besides, your dinners are served so attractively you ought to be proud to have them shown off with good lighting."

"You flatter me," Electra said with a justifiable show of pride. "But that guy abhors candle light, whereas I think it's romantic and that it adds just the right touch to a dinner party."

"Maybe so, but remember the old adage about the way to a man's heart," another of the guests said. "At our age food could be more important than romance."

"Which reminds me about one of the girls in the office," I said trying to change the subject. "She wants to write a play about three different women each seeking to marry the same man. One would be a good cook, another would be the athletic type and the third would depend upon sex to win. She wants me to tell her which, from the standpoint of a man, would stand the best chance."

"That's an interesting subject to pursue but let's talk about lighting," one of the guests interrupted. He worked for the power company and hence took more than a passing interest in the discussion. "If you ask me, I think a lot of lighting engineers are giving the public too much dessert and not enough meat and potatoes when it comes to lamps to use in the home. Women can buy plenty of decorative equipment that is attractive, but there isn't a single good inexpensive light source on the market that will provide 50 foot-candles."

"Women don't like too much light in the house," Electra commented. "Take our living room for example. When all of the lights are on it's lit up like the sidewalk under a marquee."

"That may be so," I said, "but until I put those good lamps in there I couldn't read for an hour without having my eyes burn or getting a bad headache."

"You mean you won't admit that you've reached the age where you ought to be wearing glasses," Electra said. "Besides, in the summer time when you light those big lamps, the room gets so warm I can't stand it."

"Well it should," I said. "After all, there's over a thousand watts of lamps in there. They're bound to generate a little heat."

"I'll make you a wager," our power company guest said. "If you have any three-way lamps I'll bet they aren't working satisfactorily."

"How did you guess?" I asked. "The 200-watt filament is burned out on the 200-300-500-watt lamp and the switch is broken on the 100-200-300-watt one. The big globes are too hard to buy. The only place in town where I can get one is at your office. And the switch on the smaller lamp has been fixed three times."

"A woman has to expect that, living in a house with a so-called electrical engineer," Electra said. "Did I ever tell you about the time when the waffle iron wouldn't heat?"

"Skip that story," I said blushing, for she has never forgotten the occasion when I plugged a floor lamp instead of the waffle iron cord into an outlet when we were having guests for Sunday morning breakfast.

"Your lamps prove my point when I say that the lighting people give the public too much dessert," our guest continued. "Now if you had just simple 300-watt lamps instead of those three-lamp affairs, you wouldn't have that trouble with burned out filaments or broken switches. Frankly, I think all three-lamp fixtures ought to be ruled out. The public would get more light for less money, the fixtures could be simplified, and instead of a lot of $60 to $100 monstrosities covered with onyx, you could buy a fine light source for $15 or $20."

"That's what you think," Electra said. "Women wouldn't take to that kind of a lamp. The reason they buy the three-lamp units is because they like the idea of variable quantities of light. And then besides, lamps have to be decorative. I don't want just exactly the same kind of floor lamps as my neighbor in the apartment across the hall has in her living room. We all try to be different. And besides, women are becoming more and more gadget minded—a characteristic that can be blamed on you engineers."

"Well, I won't believe it until it's tried," our guest said. "I think that more people would buy more 300-watt floor lamps for $15 or $20 than they would the three-way lamps at $60 or $100.

"Maybe so," I said, "but I seem to recollect that the lamp and fixture people tried something like that 15 years ago. The public didn't accept it. Instead, they bought the three-way lamp. Besides, with today's costs, it doesn't seem likely that any manufacturer could make a lamp in the price bracket you suggest."

"I'd like to see it tried," our guest said. "I know we could sell them if somebody would make them."

"You people always were good salesmen," Electra mused. "But I wouldn't buy it."

"I suppose you would be more intrigued by some of these 'new look' atrocities such as I saw in a high-class store — old coffee grinders or coal scuttles surmounted by huge shades with fringe or fuzz around them, and so dense that nothing but the coffee grinder got any light—costing $80 or $95, as I remember."

With that look of mischief in her eye to which there is no comeback, Electra said, "Why yes. I thought they were cute. They'd go with that Victorian furniture I've been collecting. Candles are nice too. There's something, well, romantic—."

And that seemed to settle the question.

Power Pinch is On!

Here's How *DFR Step Type Voltage Regulators Can Help You

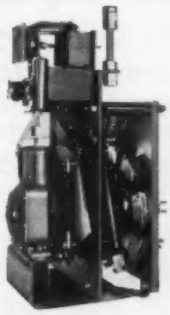
YES, the squeeze is on — System capacity is increasing slowly, while loads are increasing fast. So that today, load and system capacity are within 5% of each other. Here then, is an idea that can, in effect, boost your system capacity: Eliminate ⅔ of the kilovars due to regulator excitation by using Allis-Chalmers DFR step type regulators. These modern regulators require only 8% excitation . . . compared with 25% for conventional regulators. And DFR regulators save you $10 per installed kva on capacitors needed to balance the high exciting current of old type regulators.

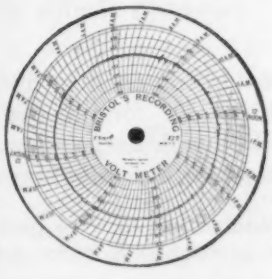
LOAD-CAP.

NEW OLD

*The DFR regulator is the only station type step regulator you can buy for single phase duty. It is furnished in sizes up to 6,900 v, 250 kva. Narrow, ± 1 volt band widths are held by the DFR regulator due to automatic "Feather Touch" control and full voltage integration. For further information on cutting kilovar losses, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2389

An oil-immersed, rugged, self centering, shock absorbing, quick-break mechanism is used.





Narrow band widths due to automatic "Feather Touch" control and full voltage integration.

ALLIS-CHALMERS A-C MILWAUKEE

ALLIS-CHALMERS

"Originators of the ⅝% Step Regulator!"

CURTIS
Forty-Sixty-One
FOR TWO 100 WATT LAMPS

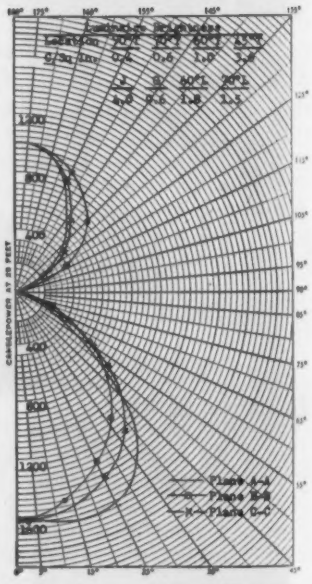
A SIMPLE SOLUTION FOR DIFFICULT PROBLEMS

News from all quarters of the world focus to a point in the news room of the Chicago Tribune. It comes in 24 hours a day . . . each shift is under tension and each person requires LIGHT . . . lots of it . . . constantly and without glare . . . regardless of architectural problems, such as a twenty-five foot ceiling!

Here the Curtis "Forty-Sixty-One" proved the perfect solution from all angles. Its direct component provides ample illumination at the working surfaces. Its indirect component (approximately 40%) reflects from the ceiling and diffuses into the room to create comfortable seeing conditions throughout. The 25° louvering shields direct view of the lamp from normal angles.

The "Forty-Sixty-One" is identical in construction and dimensions with the "Forty-Sixty," except that it is 60¾" long and is designed for two 100 watt lamps. It can be furnished with single stem hangers for continuous runs or as above illustrated for individual installation.

Complete data in your file will enable you to solve problem-jobs in offices, schools, drafting rooms, etc. profitably! Write for data sheets today.



NEMA

CURTIS *Lighting*, INC.

6135 WEST 65TH STREET, CHICAGO 38, ILLINOIS

FEBRUARY 1948 Vol. 100, No. 2

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Bethlehem Pacific Photo

Constructing salt water intake tunnel for PG and E's new steam plant addition at Hunters Point, San Francisco

THE WEST STILL BUILDS

WHEN cautious predictions at this time last year gave hints that a recession might come in 1947, those who made them did not reckon with the youth and vigor of the region. Like a growing boy, bursting the seams of the clothes that were even bought too big for him, the West, with lots of room for expansion and one-thought ample reserves, even surpluses, suddenly began to reach the limits of those reserves and burst through the top of capacities. No real letup to this climbing economy is foreseen by business leaders, even the conservative ones. Oddly enough it is the engineers who are most sanguine about the future and are preparing to be ready for its ascending demands. The sales forces in many cases have had to revert to wartime policies of selling down the requirements of eager customers, hoping thus to hold the line long enough to enable their engineer colleagues to bring up more generating capacity.

Population continued to increase. Whereas in 1940 the eleven Western states contained 10% of the U. S. population, and in 1946, 12.4%, final figures for 1948, not yet available, are expected to show a rise in this percentage. The Federal Reserve Bank for the 12th District, also notes that a larger proportion are members of the labor force than prior to 1940. Of the 2,500,000 people, more than a third of the total civilian population of five metropolitan districts in the West—Los Angeles, San Francisco Bay region, Seattle, Portland, Salt Lake City—more than a third were persons who had moved into the county of their residence since 1940.

Industrial expansion went on apace. Building construction never saw such a year as 1947 and shows no real signs of slowing up, either in residential, commercial or industrial building. Facilities to serve this growth are being hurried along as fast as materials and manpower and know-how can speed them. 1948 may not see the danger of power shortage altogether removed but many important and sizable additions to the capacity will be brought on the lines in this year. Parts of the area face shortage of water as well as of power as this is written, but late rains may alleviate this hazard.

The facts and figures for the industry are reported and analysed in succeeding pages. First the basic regional market development, generation and customer figures for the West as a whole. Then the engineering plans for plant and facilities expansion follow, with individual utility, government and municipal programs. The integration of this added plant into terms of sales potentials, quotas, accomplishments and programs for the year, come next. And in here the dealer, the salesman, the wholesaler, the manufacturer, the contractor, all can find information pertinent to his individual business. The plans and programs in the area served by his utility contain a measure of the market he can share.

Table I—Comparison of National to Western Operations for 1946 and 1947

	11 Western States		United States		Percent West to U.S.	
	1946	1947	1946	1947	1946	1947
Energy generated (Millions of Kwh.)	42,136,174	52,067,769	223,129,669	295,322,957	18.8	17.7
Energy generated in hydro plants (Millions of Kwh.)	35,260,112	37,824,609	78,397,320	82,441,783	45.0	45.9
Energy generated in fuel plants (Millions of Kwh.)	6,876,062	14,243,160	165,732,349	213,881,174	4.2	6.7
Percentage of hydro to total generated	83.7	72.7	35.1	27.9	...	...
Installed generator capacity (Kw.)†	8,703,505	8,782,489	50,303,660	51,647,107	17.3	17.0
Installed hydro generator capacity (Kw)†	6,237,186	6,254,547	14,849,036	14,861,602	42.0	42.2
Installed fuel generator capacity (Kw.)†	2,466,519	2,527,942	35,454,624	36,785,505	7.0	6.9
Revenue from energy sales (Thousands of Dollars)‡	463,577	516,800	3,459,560	3,800,000	13.4	13.6

† Source—Federal Power Commission. ‡ Data from EEI. 1947 estimated.

Table II—Ten-Year Generation Record for Western Public Utilities

	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947*
Arizona	717,825	696,787	1,327,485	1,404,299	1,459,689	2,630,936	3,198,771	3,770,667	3,435,988	2,852,606	3,238,412
California	9,632,178	9,426,519	9,403,588	9,788,869	10,383,352	11,383,154	14,776,371	15,887,456	15,943,740	17,310,002	19,964,834
Colorado	721,482	731,395	760,445	791,967	818,213	977,690	1,097,260	1,136,831	1,128,655	1,168,380	1,690,628
Idaho	972,212	992,278	1,126,518	1,175,305	1,142,341	1,244,946	1,338,183	1,233,764	1,263,032	1,333,719	1,535,479
Montana	1,319,637	1,324,151	1,575,016	1,769,124	2,177,623	2,248,133	2,597,086	2,459,781	2,318,130	2,460,586	2,771,273
Nevada	1,152,788	1,491,205	1,855,042	2,324,176	2,403,747	2,432,124	3,228,132	3,244,462	2,590,404	2,456,355	2,903,314
New Mexico	255,378	262,124	281,508	316,862	368,449	409,854	470,931	511,165	556,892	600,927	914,651
Oregon	1,392,177	1,253,615	1,484,468	1,739,903	2,909,772	3,651,159	4,619,280	4,785,539	4,183,748	4,148,612	5,694,046
Utah	507,415	340,172	425,474	577,641	564,812	604,393	619,280	436,943	416,956	456,425	1,067,526
Washington	3,734,715	3,400,683	3,642,610	3,944,184	4,499,031	6,494,920	8,926,679	10,311,897	9,689,862	9,038,856	11,850,755
Wyoming	131,139	139,205	141,135	184,701	217,343	243,697	290,538	255,575	263,403	309,706	436,851

* F P C reports for 12 months ending November.

Table III—Number of Utility Customers at End of 1946

Class of Customer	11 Western States			United States		
	1946	1947	Change	1946	1947	Change
Residential	3,876,464	4,175,000	298,536	29,769,107	31,550,000	1,780,893
Rural	381,165	419,900	39,335	1,381,291	1,520,000	138,709
Commercial and industrial	717,114	774,000	45,886	4,867,512	5,166,000	298,488
Municipal, railway and miscellaneous	19,798	20,700	902	122,381	134,000	11,619
Total	4,995,341	5,390,000	394,659	36,140,291	38,370,000	2,129,709

Table IV—Type and Capacity of Utility Generators, November 1947

State	Utilities	Plants	Total Capacity Kw.	Generator Capacity in Kilowatts of Plants Operated by— Water Power No.	Water Power Capacity	Steam Power No.	Steam Power Capacity	Internal Comb. Engines No.	Internal Comb. Engines Capacity
Arizona	18	52	681,364	15	540,759	10	94,675	27	45,930
California	23	158	3,431,770	120	1,986,235	25	1,398,025	13	47,510
Colorado	42	86	337,676	30	86,585	24	232,648	32	18,443
Idaho	15	52	287,368	43	282,446	1	400	8	4,522
Montana	18	36	373,296	21	358,313	4	11,968	11	3,015
Nevada	8	15	591,157	10	586,135	..	....	5	5,022
New Mexico	22	47	177,666	6	25,090	13	126,762	28	25,814
Oregon	18	70	904,326	52	712,807	12	186,810	6	4,709
Utah	27	77	175,294	58	92,445	4	68,750	15	14,099
Washington	20	58	1,738,855	41	1,543,212	10	202,320	7	2,323
Wyoming	30	53	83,717	15	49,520	11	27,560	27	6,637
11 Western States	241	704	8,782,489	411	6,254,547	114	2,349,918	179	178,024
United States	1,650	3,860	51,647,107	1,482	14,861,602	1,048	35,530,050	1,330	1,255,455

Table V—11 Western States Regional Market Development

Item	Year	Amount	Per Cent of U. S. Total
Population	1940	13,883,265	10.54
Families	1940	4,135,440	11.86
Education—persons 25 years and over, number	1940	8,370,478	11.19
Schooling—no year	1940	210,828	7.53
Grades—7-8 years	1940	2,654,058	10.25
High—4 years	1940	1,669,858	15.83
College—4 years	1940	511,419	15.01
Dwelling units, urban	1940	2,721,514	12.59
Dwelling units, rural	1940	1,820,319	11.58
Farms	1940	509,671	8.36
Crops and livestock value	1939	$1,512,561,000	16.59
Industry, establishments	1939	21,000	11.67
Industry, value of products	1939	$4,729,155,000	8.32
Wholesale establishments	1939	27,232	13.58
Wholesale value of sales	1939	$6,137,757,000	11.11
Retail stores	1939	213,027	12.03
Retail value of sales	1939	$5,726,300,000	13.63
Passenger auto sales	1940	402,235	12.65
Effective buying income, estimate (a)	1940	$9,171,281,000	12.36
Population	1946	17,762,026	12.40
Families	1946	5,401,400	13.99
Retail sales, total estimate	1946	$14,880,644,000	15.58
Food store sales	1946	$3,471,922,000	14.57
General Merchandise	1946	$2,237,762,000	15.13
Drugs	1946	$526,508,000	14.77
Wholesale sales, estimate	1946	$17,261,110,000	12.98
Gross farm income	1946	$4,339,600,000	18.45
Bank Deposit Total	1944	$13,094,809,000	12.85
Demand	1944	$7,994,022,000	12.30
Time	1944	$5,099,787,000	13.80
Motor vehicle registration	1946	5,543,730	16.33
Effective buying income, gross	1946	$23,177,013,000	14.47
Water-borne commerce—cargo tons	1945	115,826,240	21.12

(a) Effective buying income estimates based on "Sales Management" reports.

SPOT LIGHTED

Production Increased industrial activity in the West during 1947 was accompanied by a healthy 16% increase in production of electric energy, the total for the year reaching a record 48,845,000 kwh. Continued below-normal precipitation brought the proportion of fuel-generated power up from 16% to 23% of the total, with every indication that it will continue to rise.

Capacity This year saw the first significant addition to generating capacity since the war, with a half million kva. of steam and hydro put in service. An additional 1½ million kva. is scheduled for 1948, with a staggering total of 3½ million kva. planned for 1949 and later.

Expenditures Power companies and municipal systems spent a whooping $254,332,455 during 1947, exclusive of federal power funds. Comparison to the 1946 figure of $105,000,000 indicates the growing magnitude of construction activities in the West.

Budgets Overshadowing 1947 by an additional 40%, 1948 budgets amount to an impressive $360,000,000. With some $75,000,000 planned for federal power projects, the grand total of $435,000,000 for expenditures in the eleven Western states is pushing the half billion mark.

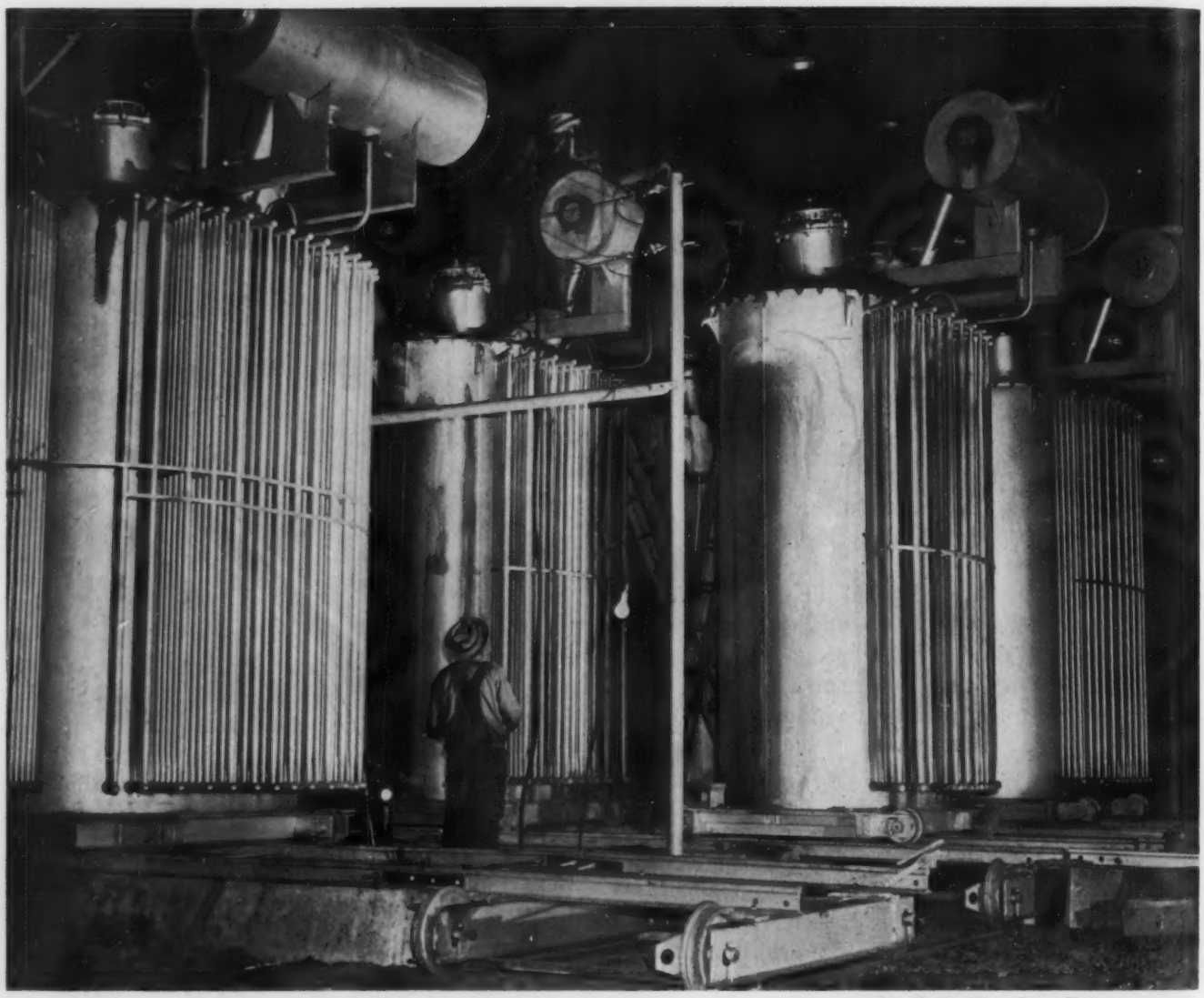
Customers Western power systems passed the 5,000,000 mark in 1947 with a total of 5,390,000 customers being served by the end of the year, an increase of 8% over 1946. With long-standing backlogs still at the mercy of material and manpower shortages, continued growth is anticipated for some time to come.

Energy Use In competition with increased industrial activity, more than 10% of the customers added to the utility systems during 1947 were rural customers. The West was again ahead of the U. S. in producing 9,100 kwh. per customer compared to the national figure of 6,670 kwh. per customer.

Industry As the West grows in stature as a market for consumer goods, because of its 16,385,000 population and high per capita purchasing power, industries are moving into the area more economically to supply the market. Freight differentials for raw materials vs. finished products favor this trend. Plant expansion is reported in all areas. The chemical industries are increasing in importance as electric power for their development is a prime consideration.

Construction It is estimated that 25% of all home construction in the U. S. is located in the far Western states, and some 200,000 new dwelling units will be built in 1948, which should make a market for $157,000,000 in wiring supplies and lighting. Store modernization and new construction, long deferred by war and restrictions, is in full stride.

Appliances Taxing the abilities of Western utilities to serve and of manufacturers to supply facilities to serve and appliances to meet the demand, 1947 broke all appliance records in both units and dollar volume and all quotas for 1948 are higher provided the merchandise is available.



Washington Water Power Photo

1947—BUILDING FOR NEW LOADS—1948

TOPPING the record-breaking year of 1946 by nearly 2½ times, expenditures of private and municipal systems of the eleven Western states exceeded $254,000,000 during 1947. Additional sums budgeted but unspent because of continued shortages and extended deliveries of critical materials and equipment (which cut by one-third nation-wide installation of generating and substation capacity planned for 1947) will be added to the $360,000,000 budgeted for 1948 by these same systems. In addition, the U. S. government will spent about $75,000,000 for power facilities in the West through REA loans, USBR, Bonneville Power Administration and Army Engineers, bringing the grand total for 1948 to more than $435,000,000.

Addition of 500,000 kva. of system generating capacity during 1947 with 1½ million kva. scheduled for 1948 is indicative of the continued healthy growth of the industry. This stepped-up installation of generating capacity in 1948 will account for about 45% of construction expenditures, transmission and distribution 50%, and general plant the remaining 5%. Total additions presently anticipated for 1949 and later amount to a staggering expansion of well over 3½ million kva.

Of particular interest from an engineering standpoint during 1947 were the manifold problems of operating generation, transmission and distribution facilities under unprecedented heavy continuing load conditions. Many utilities are spending significant sums to raise distribution voltages from 2,400 to 4,160 volts and to add static capacitors to maintain or improve voltage conditions on their heavily overloaded lines. Ever-increasing numbers of unit substations are going into service, and more and more attention is being given to putting systems underground in metropolitan areas. Heavy investments in mobile communication equipment by small as well as large utilities have contributed to the relentless struggle against rising costs of

USBR Photo—Grand Coulee Dam

operation by making possible more efficient use of men and facilities in the field; a single example being the now common use of two-way radio in construction of transmission lines.

More important, however, in a year which saw system peak demands up some 12-15%, was the dwindling margin of available reserve capacity. Although the western division of the Pacific Northwest Power Pool called for voluntary curtailment by a few customers for a short time during the '47-'48 winter peak, there was no significant curtailment of power in the West during 1947. Assuming precipitation in a large part of the West to continue considerably below normal, another tight squeeze is anticipated during 1948, after which added steam and hydro capacity will go far to compensate for future load growth, even in dry years. One small cloud on the horizon of 1949 and years to follow is the increasing cost of fuel oil to operate these steam plants. Even now design of new plants must contemplate conversion to coal when use of oil can no longer be justified on an economic basis. Surefire topics of conversation in the months ahead will be fuel prices—and the weather.

Federal

Bureau of Reclamation

Projects are listed under the states in which they are located. A tabulation of USBR current and future power development appears on page 80 and a tabulation of transmission lines on page 81.

Bonneville

Activities of the Bonneville Power Administration are reported on page 84.

REA

REA borrowers in the eleven Western States continued to expand their operations at a rapid pace in the calendar year 1947. During the first eleven months of the year they added 5,301 miles of distribution lines to their systems and brought service to an additional 5,526 farms and other rural establishments. This expansion brought to 40,393 the total miles of lines they are operating and to 108,777 the number of consumers they are serving.

While 81% of the farms in the Western United States are electrified, as compared with the national average of 61%, a substantial job of rural electrification remains ahead in the eleven states with 95,048 farms still unelectrified as of July 1. In addition an approximately equal number of other rural establishments, such as non-farm homes, schools, churches and small industries, are still unelectrified in these states.

Besides the new distribution lines energized, the construction program of REA borrowers included widespread rephasing and other system improvements and several generation and transmission projects. During the year consumption of electricity showed a tremendous increase in the eleven Western States with areas in Arizona, New Mexico, Utah, Colorado and Wyoming reporting acute power shortages. In particular the power shortages affected irrigation areas during the peak irrigation period. Until additional generation facilities are secured, the power shortages will curtail use of electricity for present irrigation pumps in these particular areas and largely preclude the extension of new irrigation lines.

REA loans in the Western States totaled $19,940,600 during the year, bringing the 12-year total to $103,073,254. Loans approved during 1947 will finance rural electric facilities including 9,724 miles of new distribution lines to serve 20,491 farms and other rural establishments.

Nine new areas will be opened up for REA-financed rural electrification projects as a result of REA approving initial loans to four borrowers in New Mexico, three in Arizona and two in Washington. It is expected that the majority of the present borrowers, who have not energized their systems, will be in operation by the end of this year. Status of REA-financed systems is given in the tables on pages 70 and 71. A table of REA operations in the Western States appears on page 77 and one on farm electrification on page 87.

Arizona

Davis Dam Project, USBR

Construction continued during 1947 on Davis Dam and the 225,000-kw. power plant, although progress was delayed somewhat due to unforeseen adverse foundation conditions encountered. It is expected that excavation and foundation grouting will be completed and construction of concrete structures will start during 1948. Construction of the transmission system is under way and will be continued during the coming year. The Kingman-Davis transmission line was completed in 1947.

Central Arizona L. & P. Co.

Central Arizona Light and Power Co. spent for new and improved facilities during 1947 approximately $3,500,000. The number of new customers added and peak load far exceeded the estimate made when preparing the 1947 budget. Approximately 7,100 electric meters were added, making a new total of 54,000 electric meters in all divisions. The peak load reached an all-time high of 96,000 kw., which is approximately 33% higher than the previous year. The kilowatt-hours increased approximately 100,000,000 over the previous 12 months.

To meet all these new requirements, the installation of a new 30/33,000-kw. generating unit is progressing and is expected to be completed by the latter part of June 1948 at a total cost of $2,750,000. During 1947 approximately $700,000 was spent on this project.

The 69-kv. transmission system was extended by an additional 105 miles of transmission line, and the distribution line mileage increased approximately 200 miles. These lines extended electric service into new areas in western Maricopa County and northern Yuma County. Electric service is now available from the company's lines in Wenden, Salome, Hope, Quartzsite and Bouse. Additional lines have been added in other rural and agricultural areas, picking up pumping load and providing domestic service on the farms. There have been approximately 25,000 kva. of transformer capacity added and 750 kva. of capacitors.

The company also secured two-way FM radio communication equipment, installing repeater stations to get system coverage, and we are now operating 13 mobile units at various points on the system. This equipment has greatly benefited the operation of the system in the rural areas where no

Status of Western REA-Financed Systems

	Cumulative Construction Loan Allocation 12/31/47	1947 Construction Allocations	Miles Energized 12/1/47	Consumers Connected 12/1/47
ARIZONA	**$ 5,060,786**	**$2,359,500**	**762†**	**3,981†**
Stonewall Elec. Co., Tucson	100,000§	.....	116†	200†
San Carlos Irrig. & Drain. Dist., Coolidge	142,286§	.....	117†	331†
Navopache Elec. Co-op.,‡ Lakeside	56,000	.....	7†	114†
Sulphur Springs Valley Elec. Co-op., Willcox	1,478,000	440,000	334	1,948
Littlefield Elec. Co-op., Littlefield	29,000	.....	*	*
Graham County Elec. Co-op., Pima	809,500	514,500	165†	1,278
Ma-Yu Elec. Co-op., Buckeye	790,000	.....	*	*
Trico Elec. Co-op., Tucson	600,000	600,000	*	*
Verde Elec. Co-op., Cottonwood	325,000	65,000	8†	15†
Mohave Elec. Co-op., Kingman	310,000	310,000	15†	95†
Duncan Valley Elec. Co-op., Duncan	430,000	430,000	*	*
CALIFORNIA	**$ 3,130,429**	**$ 665,000**	**1,718†**	**7,257†**
Imperial Irrig. Dist., Imperial	700,000	.....	700†	4,150†
Surprise Valley Electric. Corp., Alturas	1,253,500	465,000	526	1,355
Plumas-Sierra Rural Elec. Co-op., Portola	642,000	200,000	350	883
Mountain Empire Elec. Co-op., Campo	227,000	.....	139	789
Klamath River Elec. Co-op., Hornbrook	240,000	.....	3†	80†
Mesa Elec. Co-op., Inc., Phelan	67,929	.....	*	*
COLORADO	**$21,838,551**	**$4,736,000**	**9,835†**	**29,200†**
Grand Valley Rural Power Lines, Grand Junction	696,000	125,000	367	1,896
San Luis Valley Rural Elec. Co-op., Monte Vista	1,449,000	375,000	595	1,385
Morgan County Rural Elec. Assn., Fort Morgan	1,630,000	.....	775	1,483
Intermountain Rural Elec. Assn., Littleton	1,639,000	120,000	983	3,065
S.E. Colo. Power Assn., La Junta	2,073,810	.....	1,550	3,866
Gunnison County Elec. Assn., Crested Butte	335,000	.....	123	494
Delta Montrose Rural Power Lines Assn., Delta	834,000	256,000	559†	1,694†
Union Rural Elec. Assn., Brighton	1,170,000	164,000	603†	1,802†
San Isabel Elec. Assn., Pueblo	405,000	145,000	260	830
San Miguel Power Assn., Nucla	251,000	.....	195	730
Highline Elec. Assn., Holyoke	2,525,000	700,000	1,039†	2,044†
Poudre Valley Rural Elec. Assn., Fort Collins	1,071,000	195,000	790	2,382
La Plata Elec. Assn., Inc., Durango	780,000	500,000	324	1,148
Empire Elec. Assn., Cortez	805,000	.....	147†	2,064†
Holy Cross Elec. Assn., Eagle	730,000	260,000	152†	713†
Sangre De Cristo Elec. Assn., Salida	454,000	.....	210†	680†
Yampa Valley Elec. Assn., Steamboat Springs	996,000	440,000	199†	335†
Mountain View Elec. Assn., Limon	2,275,000	600,000	916	1,917
Y-W Elec. Assn., Yuma	958,000	608,000	*	*
White River Elec. Assn., Meeker	658,000	248,000	19†	517†
Monument Elec. Co., Trinidad	103,741	.....	29	209
IDAHO	**$ 7,585,295**	**$1,508,000**	**3,601†**	**9,436†**
Northern Idaho R. Elec. Rehab. Assn., Sandpoint	1,629,750	356,000	672	1,732
Clearwater Valley L. & P. Assn., Lewiston	2,748,000	700,000	1,283	3,102
Kootenai Rural Elec. Assn., Coeur d'Alene	876,000	190,000	428	1,531
Long Valley Power Co-op., Donnelly	196,045§	.....	165†	420†
Idaho County L. & P. Co-op. Assn., Grangeville	583,500	68,000	314	637
Raft River Rural Elec. Co-op., Malta	406,000	.....	155†	314†
Fall River Rural Elec. Co-op., Ashton	725,000	185,000	311†	930†
Lost River Elec. Co-op., Mackay	259,000	.....	110†	614†
Prairie Power Co-op., Fairfield	162,000	.....	163	156
MONTANA	**$17,625,298**	**$3,434,000**	**5,785†**	**15,796†**
Ravalli County Elec. Co-op., Corvallis	326,000	73,000	285	750
Sun River Elec. Co-op., Fairfield	1,610,500	165,000	671†	1,384†
Lower Yellowstone Rural Elec. Assn., Sidney	396,600	.....	249	655
Yellowstone Valley Elec. Co-op., Huntley	903,498	.....	578	1,714
Vigilante Elec. Co-op., Dillon	1,355,000	405,000	673	1,285
Missoula Elec. Co-op., Missoula	495,000	.....	258	541
Flathead Elec. Co-op., Kalispell	405,000	.....	300	1,069
Fergus Elec. Co-op., Lewistown	1,943,000	1,040,000	626	1,220
Park Elec. Co-op., Livingston	725,000	.....	253	589
Mid-Yellowstone Elec. Co-op., Hysham	385,000	100,000	230	502
Beartooth Elec. Co-op., Red Lodge	1,002,000	175,000	547	1,058
Big Horn County Elec. Co-op., Lodge Grass	752,000	310,000	420	830
Big Flat Elec. Co-op., Turner	469,000	150,000	142†	200†
Sheridan County Elec. Co-op., Westby	587,000	87,000	3†	100†
Northern Elec. Co-op., Opheim	655,000	100,000	6	120
Valley County Elec. Co-op., Glasgow	470,000	.....	178	194
McCone County Elec. Co-op., Circle	775,000	225,000	54	453
Goldenwest Elec. Co-op., Wibaux	514,000	84,000	*	*
Glacier County Elec. Co-op., Cut Bank	881,000	.....	120	1,674
Marias River Elec. Co-op., Shelby	1,455,000	100,000	152	1,413
Hill County Elec. Co-op., Havre	1,520,000	420,000	40†	45†
NEVADA	**$ 286,000**	**$ .....**	**147**	**667**
Alamo Power Dist. No. 3, Alamo	69,000	.....	24	72
Overton Power Dist. No. 5, Overton	217,000	.....	123	595

	Cumulative Construction Loan Allocation 12/31/47	1947 Construction Allocations	Miles Energized 12/1/47	Consumers Connected 12/1/47
NEW MEXICO	**$ 9,289,000**	**$2,877,500**	**2,716†**	**8,426†**
Central Valley Elec. Co-op., Artesia	786,000	.....	294†	1,067†
Roosevelt County Elec. Co-op., Portales	1,207,000	.....	425†	1,318†
Farmers' Elec. Co-op., Clovis	1,655,000	265,000	827	1,951
Kit Carson Elec. Co-op., Taos	1,140,000	.....	207†	1,270†
Otero County Elec. Co-op., Cloudcraft	676,000	.....	246	660
Stonewell Elec. Co., Albuquerque	224,500	.....	333†	605†
Mora-San Miguel Elec. Co-op., Mora	748,000	475,000	185†	379†
Sierra Elec. Co-op., Hillsboro	235,000	85,000	4†	63†
Springer Elec. Co-op., Springer	522,000	317,000	100†	175†
The Socorro Elec. Co-op., Socorro	408,000	48,000	95	938
Central N. Mex. Elec. Co-op., Corona	707,500	707,500	*	*
Continental Divide Elec. Co-op., Gallup	280,000	280,000	*	*
Columbus Elec. Co-op., Columbus	150,000	150,000	*	*
Southwestern Elec. Co-op., Clayton	550,000	550,000	*	*
OREGON	**$11,495,684**	**$1,841,600**	**4,260†**	**15,019§**
Blachly-Lane County Co-op. Elec. Assn., Blachly	522,000	215,000	144†	778†
Benton-Lincoln Elec. Co-op., Corvallis	1,905,000	.....	802	2,840
Umatilla Elec. Co-op. Assn., Hermiston	513,000	180,000	306	958
Malhour Co-op. Elec. Assn., Vale	375,000	.....	336	655
Douglas Elec. Co-op., Roseburg	1,114,500	150,000	438	1,715
Lane County Elec. Co-op., Eugene	1,629,600	471,600	452	2,457
Coos Elec. Co-op., Coquille	1,420,000	450,000	334	1,507
N.E. Clackamas County Elec. Co-op., Sandy	464,000	.....	118	434
Tillamook PUD, Tillamook	195,000	.....	53	115
Central Elec. Co-op., Redmond	496,000	75,000	705†	993†
Wasco Elec. Co-op., The Dalles	1,140,000	100,000	638	885
Columbia Basin Elec. Co-op., Heppner	710,000	200,000	*	*
W. Ore. Elec. Co-op., Vernonia	769,000	.....	230†	1,591†
Jordan Valley Elec. Co-op., Jordan Valley	27,584§	.....	4†	91†
Eastern Ore. Elec. Co-op. Assn., Pendleton	215,000	.....	*	*
UTAH	**$ 2,147,000**	**$ 135,000**	**930†**	**3,018†**
Garkane Power Assn., Richfield	771,000	.....	322	1,443
Moon Lake Elec. Assn., Mt. Emmons	1,036,000	.....	487	1,340
Beaver Valley Elec. Assn., Beaver City	12,000	.....	13†	45†
Escalante Valley Elec. Assn., Modena	239,000	115,000	80†	143†
Flowell Elec. Assn., Fillmore	31,000	.....	28†	47†
Dixie Rural Elec. Assn., St. George	58,000	20,000	*	*
WASHINGTON	**$16,149,611**	**$3,275,000**	**7,394†**	**18,245†**
Benton Rural Elec. Assn., Prosser	1,119,500	180,000	582	1,599
Orcas P. & L. Co., Eastsound	1,122,000	450,000	119	960
Mutual P. & L. Assn., North Bend	37,919	.....	15†	47†
PUD No. 1 of Klickitat County, White Salmon	1,645,000	775,000	93†	400†
Inland Empire Rural Elec., Spokane	2,825,000	.....	2,659	4,888
Columbia County Rural Elec. Assn., Dayton	681,000	.....	400	674
Quinault Light Co., Quinault	125,000	43,000	25	213
PUD No. 1 of Lewis County, Chehalis	659,000	250,000	322	1,714
PUD No. 1 of Kittitas County, Ellensburg	246,000	.....	190	387
Stevens County Elec. Co-op., Colville	1,118,000	340,000	560	1,413
Chelan County Elec. Co-op., Leavenworth	106,000	.....	65	201
Okanogan County Elec. Co-op., Winthrop	170,000	.....	123	428
Pend Oreille Elec. Co-op., Newport	461,000	.....	340	728
Big Bend Elec. Co-op., Ritzville	1,142,000	415,000	670	600
Lincoln Elec. Co-op., Davenport	1,129,000	.....	812	795
Nespelem Valley Elec. Co-op., Nespelem	351,000	.....	60	423
PUD No. 1 of Clallam County, Sequim	553,000	.....	30†	459†
PUD No. 2 of Grant County, Ephrata	359,000§	.....	24†	743†
PUD No. 1 of Ferry County, Republic	510,000	.....	53	393
PUD No. 1 of Douglas County, Bridgeport	854,000	150,000	67	500
Mason County PUD No. 1, Shelton	105,000	42,000	*	*
PUD No. 1 of Pend Oreille County, Newport	230,000	230,000	*	*
PUD No. 1 of Okanogan County, Okanogan	400,000	400,000	*	*
PUD No. 1 of Cowlitz County, Longview	201,129§	.....	185†	680†
WYOMING	**$ 8,465,600**	**$1,229,000**	**3,245†**	**7,732†**
Riverton Valley Elec. Assn., Riverton	524,000	167,000	335	683
Big Horn Rural Elec. Co., Basin	638,000	.....	443†	1,141†
Wyrulec Co., Lingle	824,000	.....	341	1,112
Bridger Valley Elec. Assn., Mountain View	287,000	.....	121†	404†
Wheatland Rural Elec. Assn., Wheatland	470,000	.....	180†	380†
Lower Valley P. & L., Freedom	599,500	.....	230	951
Garland L. & P. Co., Powell	195,300	83,000	83	246
Washakie Rural Elec. Co., Worland	56,500	.....	71	188
Rural Elec. Co., Pine Bluffs	1,644,000	138,000	800	1,075
Hot Springs Co. Rural Elec. Assn., Thermopolis	365,000	180,000	133	165
Carbon P. & L., Saratoga	757,000	393,000	118	572
Niobrara Elec. Assn., Lusk	421,000	.....	*	*
Shoshone River Power, Cody	320,000	58,000	220	264
Sheridan-Johnson Rural Elec. Assn., Sheridan	430,000	210,000	*	*
Tri-County Elec. Assn., Sundance	855,000	.....	5†	323†
Sheridan Suburban Elec. Co., Sheridan	78,700	.....	165†	228†

* Not Energized † Estimate § Loan Repaid
‡ Formerly White Mountain Elec. Co-op.

telephone service is readily available.

A project is now underway for the installation of pilot wire relaying and supervisory control for seven substations in the Phoenix area. This system in the future will be extended to other substations.

The company acquired the electrical distribution system from the Parker Electric Supply Co. serving the town of Parker in northern Yuma County on the Colorado River. There are approximately 300 customers in this community and power is received from the U. S. Bureau of Reclamation Parker Project through the U. S. Indian Service facility supply the Colorado River Indian Reservation.

The company's 1948 construction budget calls for an expenditure of approximately $3,738,000, of which $1,885,000 will be spent for completing production facilities earlier described as being installed. Approximately 40 miles of transmission line are contemplated to be built with associated substation equipment at an expenditure of approximately $262,000 for all the transmission facilities. Additions to the distribution plant account for approximately $1,592,000.

The U. S. Bureau of Reclamation completed construction of the second 161-kv. transmission line into the Phoenix terminal from Parker during the early part of 1947. This additional interconnection and the installation of the new generating facilities (33,000 kw.) at the company's steam plant make it necessary to replace all the oil circuit breakers on the 12-kv. bus with duty rating of 1½ million kva., which entails an expenditure of approximately $125,000.

The company is also proceeding with its project of converting the distribution system from 4-kv. to 7.2-kv. 4 wire. This project alone accounts for approximately $50,000 expenditure, and other improvements in reconstruction of the electric distribution system will amount to an additional $75,000. This cut over permits taking a large percentage of the load growth at the higher distribution voltage and all purchases of distribution transformers will be in the 7,200-volt class.

The mobile radio equipment is being expanded by adding ten more units, accounting for an expenditure of approximately $9,000.

Supervisory control equipment on order and to be installed this year accounts for an expenditure of approximately $50,000.

The building activity in the Phoenix area is still at a high peak and no doubt will continue at the same pace through most of 1948. It is estimated that approximately 6,500 new custom-

ers will be connected throughout the year and the peak load will reach approximately 114,000 kw.—*George H. Groh, chief engineer and general superintendent.*

Salt River Valley Assn.

We spent, during the year 1947, for new and improved facilities approximately $1,257,000. At present the situation for 1948 cannot be forecast. We are in about the same position of uncertainty as we were last year, due to the possibility of the sale of the power generating plants to the United States government.

The major additions or betterments to our system during 1947 consisted of the construction of a new marine boiler, principally for the purpose of permitting an overhaul of the old boilers. The cost of the addition was approximately $175,000. We are also completing an additional gas line to increase the quantity of gas-fuel delivery to our steam plant. This is costing approximately $6,000.

There was no generating capacity added in 1947. The transformer capacity was increased by 5,375 kva. of rural substations and 10,375 kva. by distribution substations. We installed approximately 45 miles of transmission lines, 11 kv. and up, and 85 miles of rural distribution. We have no urban distribution.

During the year we added 5,163 meters to the system.

The 1947 system peak was 146,700 kw., or an increase of approximately 9% over 1946.

Plans for 1948 are very indefinite but we do anticipate an increase in the system peak of about 10% over 1947.—*F. L. Roe, chief engineer.*

Tucson G. E. L. & P.

Expenditures of $1,000,000 during 1947 will be matched in 1948, and construction will be slightly accelerated. Installation of 11,563 kva. of transformers, 2.4 miles of transmission and 78 miles of distribution kept pace with the 5,488 meters added as system peak increased 11% during the year. Generating capacity will be augmented by addition of 4,000 kw. of diesel units in 1948, and an additional 14,000 kva. of transformers will be installed. Line construction will keep pace with an estimated 13% increase in peak, with three miles of transmission and 82 miles of distribution being planned. Supervisory equipment will be installed on the 44-kv. system, and 2,000 kva. of capacitors will be added. A 20,000-kw. turbine is scheduled for installation in 1949.—*J. R. Snider, president.*

Central Arizona Light & Power adds new 30/33,000-kw. unit in addition to main building of its existing steam plant. Unit is to be completed by mid-1948

California

Anaheim L. & W. Dept.

Expenditures for 1947 of $41,738 were above the original estimate, but are expected to drop to $23,000 for 1948. System peak of 4,200 kw., representing an increase of 24% over 1946, was accomplished through enlargement of transformers both in light and power loads by some 800 kw. A further increase of about 10% is anticipated, in addition to scheduled construction of two new unit substations for Essex Wire Corp., to be 3,000 kw. and 1,500, both 11-2.5 kv. Line construction in 1947 was one mile of 2,500 volts, and a very short piece of 11,000 volts.—*V. W. Hannum, superintendent.*

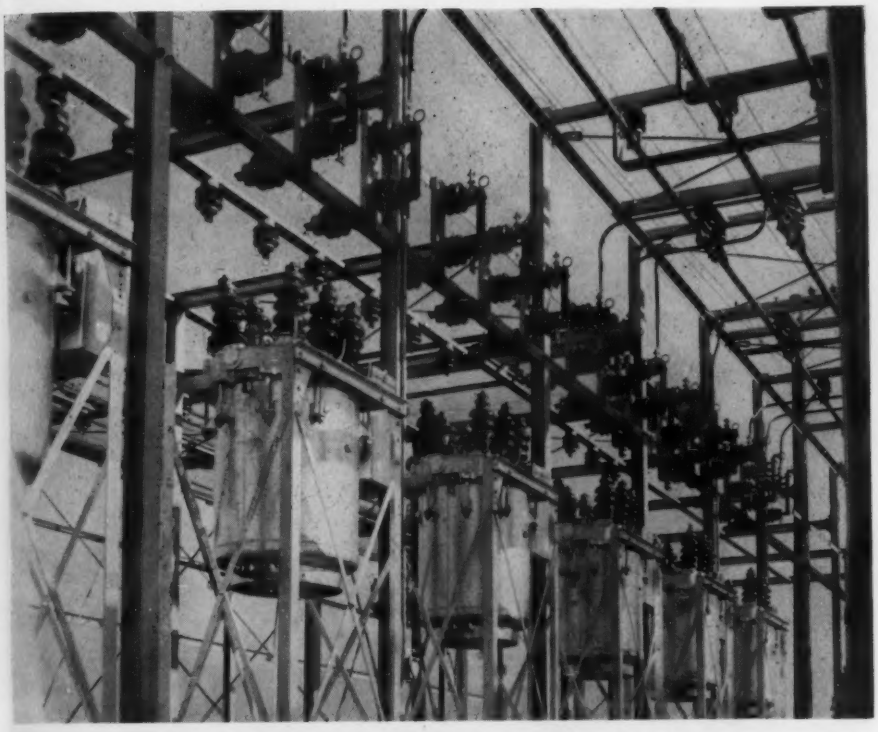
Burbank P. S. Dept.

The capital expenditure of $225,000 during 1947 did little more than keep pace with new consumer demands. The heavy backlog of deferred maintenance on the distribution system was reduced but slightly during this year in which we experienced critical shortages of labor and materials. Slowness in delivery of equipment for the three major projects in our expansion program has caused a full year's delay in scheduled completion dates.

Distribution feeders are nearly all badly overloaded. Ten out of fifteen 4.3-kv. feeders, designed for 200 amp., ± 10% regulation, are now carrying loads of 300 to 400 amp. The regulators, reconnected for 400 amp, ± 5% regulation, are unable to give proper regulation. Such overloading of feeders is due to delay in beginning operation of the new 20,000-kva. Victory distributing station, originally scheduled for completion in time to meet the 1947 winter load. Long delivery time on 34.5-kv. oil circuit breakers and two 10,000-kva. transformer banks was the cause of the delay. Total cost of this station will be approximately $250,000.

Burbank population has more than doubled since the 1940 census, and all indications are for continued rapid growth. Several large tracts are undergoing subdivision and will require extensions to the distribution system. These and other domestic and commercial developments indicate that the present rate of nearly 200 new meter installations per month will be exceeded during 1948.

Electric meters in customer service at the close of 1947 were 24,168 in number, a net gain of 2,191 during the year. There are still approximately 50 unmetered services, a hangover from the meter shortage of 1946. Nearly 100,000 conductor-feet of 4.3-kv. primaries and 108,000 conductor-feet of secondaries were added to the distribution system this year. These



Long delivery time on equipment badly delayed much needed Victory distributing station of Burbank Public Service Department. Cost—$250,000

quantities will be exceeded during 1948. A total of 147 distribution transformers, having an aggregate capacity of 5,460, were added to the system in service extensions and helped relieve badly overloaded transformers. Distribution transformers are still being operated at loads higher than good practice permits.

System peak demand for 1947 was the same as for 1946, but consumption dropped 5% to 170,000,000 kwh. The reduction in system load results from decreased activity in the aircraft industry, whose consumption this year dropped nearly 22,000,000 kwh. In all other classifications, the loads have shown increases as follows:

Domestic	14%
Commercial light	33%
Commercial power	69%
Street lighting	19%

Scheduled completion date for the 20,000-kw. steam turbogenerator unit has been changed from October 1948, to May 1949, because of slow delivery from manufacturers. Engineering on the new unit is being held up by slow delivery of equipment drawings needed for plant layout and design work. This unit will cost more than $2,000,000 and will double the present generating capacity which now consists of two 10,000-kw. units.

A major revision of the 34.5-kv. section of the Burbank receiving and distributing station is being undertaken in connection with the steam plant addition. Four 34.5-kv. switch bays are being added: one for the new generator's 25,000-kva. transformer bank, two for the two 3,750-kva. station-auxiliaries power banks, and the fourth for spare position, ultimately to be used for the output from a fourth generating unit. Also being undertaken at this time is the double busing of the 34.5-kv. section. This project will be completed shortly after the close of 1948 at a cost of $240,000.

Total expenditures for system improvements and additions for 1948 will be $2,500,000 which includes approximately 70% of the cost of the system plant addition, although this unit will not be in operation until 1949. Also included in this figure is the $500,000 office building, site clearing for which was started on Dec. 8, 1947.

California Electric Power

California Electric Power Co. spent some $2,890,000 for new and improved facilities in 1947 and has budgeted for 1948 the sum of $3,910,000 for the same purposes. Major additions and betterments to the system during 1947 included: addition of automatic reclosing features to oil circuit breakers on important circuits, installation of voltage regulators at several distribution points, more general use of pole-type capacitors on distribution circuits for power factor betterment and voltage correction; reconstruction of bus and switching sections at several important substations, addition of new feeder circuits and increase in the capacity of many distribution substations, and an extensive program of cutting over substations and primary distribution lines from 2,400 volts to 4,800 volts.

Increase in distribution substation transformer capacity during the past year amounted to 23,200 kva., with construction of 463 miles of distribution lines. System peak was 101,200 kw., an increase of 18.5% over 1946; net change in meters in service was 7,000 added.

The construction program for 1947 indicates a definite trend toward a wider use of radiotelephone as an adjunct to communication lines, more general application of supervisory control for substations, and more attention to improving voltage regulation on distribution circuits by the use of capacitors and voltage regulators.

Among the improvements planned for 1948 are: continuation of the program of installing remote recording and supervisory control for certain of the generating plants, extension of the radiotelephone system to give a greater transmission line coverage, more extensive use of supervisory control of transmission and distribution substations, continuation of the program of installing automatic reclosing features at many unattended stations, and further installations of induction and step-voltage regulators at important urban and rural substations. Also planned are improvements of bus and switching facilities at important substations, addition of new 33-kv. circuits in selected areas to meet the increased demands, expansion of 69-kv. transmission facilities into load centers, involving both line and substation construction, cutover of distribution circuits to 4.8- or 12-kv. operation, and more general use of capacitors at selected locations on distribution circuits.

The 1948 construction program includes the installation of 27,200 kva. in distribution substation transformer capacity and some 20,000 kva. of pole line transformers, 2 miles of 88-kv. line, 51 miles of 69-kv. line, and 269 miles of 33-kv. and below. A peak of 115,000 kw. is anticipated for 1948, representing an increase of about 14%.—*R. H. Halpenny, chief engineer.*

California Pacific Utilities

With system peak up sharply (35%) over 1946, and another increase of 20% anticipated in 1948, expenditures of $600,000 went mostly for additions

to distribution systems. To accommodate the 2,000 meters added during 1947, 110 miles of distribution lines were constructed, and 8,000 kva. of transformer capacity installed. Budget of $500,000 for 1948 includes $200,000 for an additional 110 miles of distribution lines, and $65,000 for carrier-current water-heater controls in Baker and La Grande, Ore. Installation of 10,000 kva. of substation capacity is scheduled for 1949.—*E. K. Albert, vice-president and chief engineer.*

Central Valley Project, USBR

During 1947 installation of one 75,000-kva. generating unit at Shasta power plant was completed and installation of a similar unit was nearly completed. These units were removed from Grand Coulee power plant, where they were used during the war. Installation of an additional 75,000-kva. unit at Shasta is expected to be completed during 1948. Construction at Keswick power plant continued during 1947. Delivery of equipment is scheduled during the first part of 1948 and installation of the generating units is expected to be completed during the latter part of the year. Construction on irrigation features of the Central Valley Project advanced considerably, including partial excavation of the Tracy dumping plant site. Contract for construction of Shasta to Cottonwood and Gas Point Road 230-kv. transmission lines was awarded in 1947 and construction is expected to be completed in 1948. During 1948 construction is also expected to start on the Elverta and Tracy switchyards and the Elverta-Perkins-Tracy transmission line, and construction of the Oroville-to-Elverta transmission line is expected to be completed.

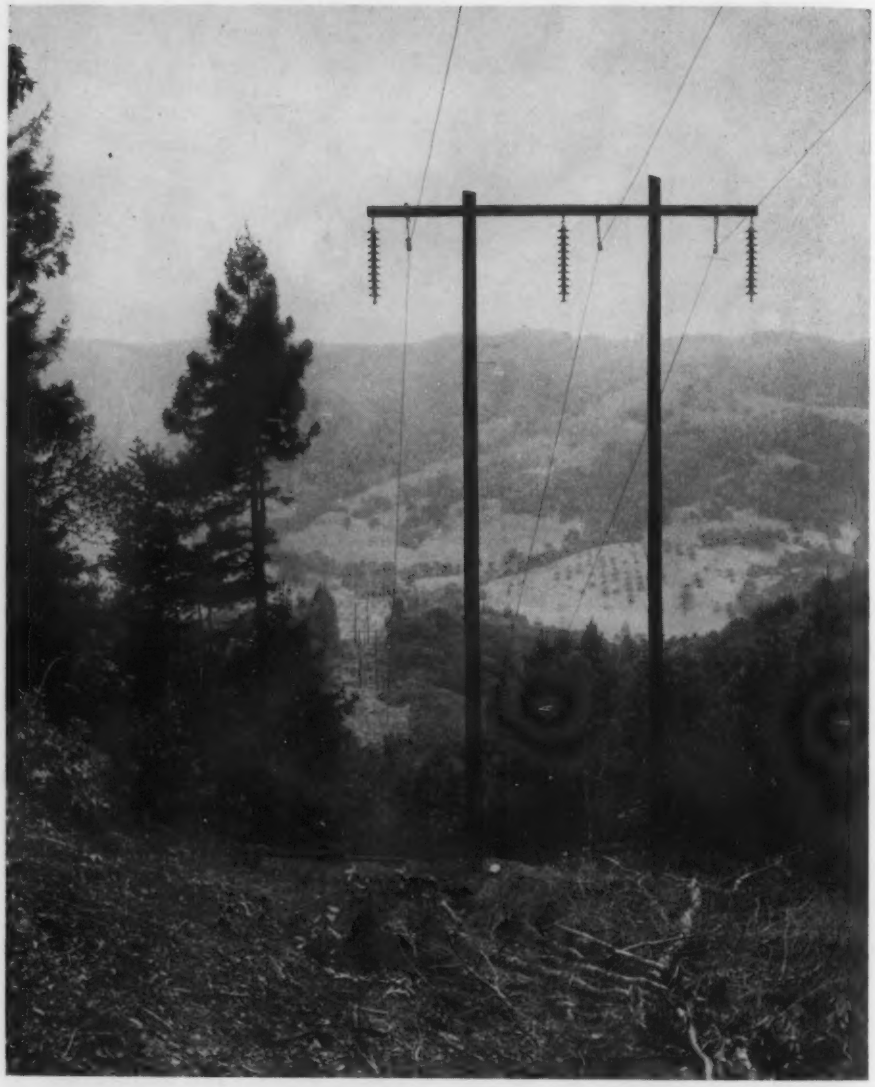
Coast Counties G. & E.

During 1947, Coast Counties expended $1,100,000 for additions to capacity and new business. It is anticipated that the 1948 expenditures will again exceed $1,000,000, with an even greater portion going to provide service for new consumers.

Transformer capacity was increased by a total of 6,167 kva. in 1947. A 14-mile 110-kv. line was built from Morgan Hill to Watsonville, to go into service early in 1948, and additions to distribution lines included 80 miles of 4-kv. and 16 miles of 12-kv.

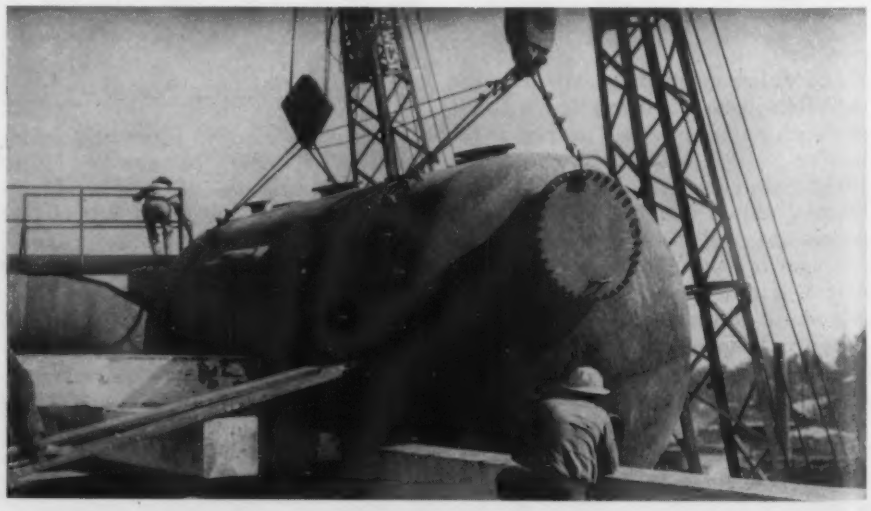
System peak for the year was approximately 38,000 kw., an increase of 17% over 1946; number of active meters increased by 3,000.

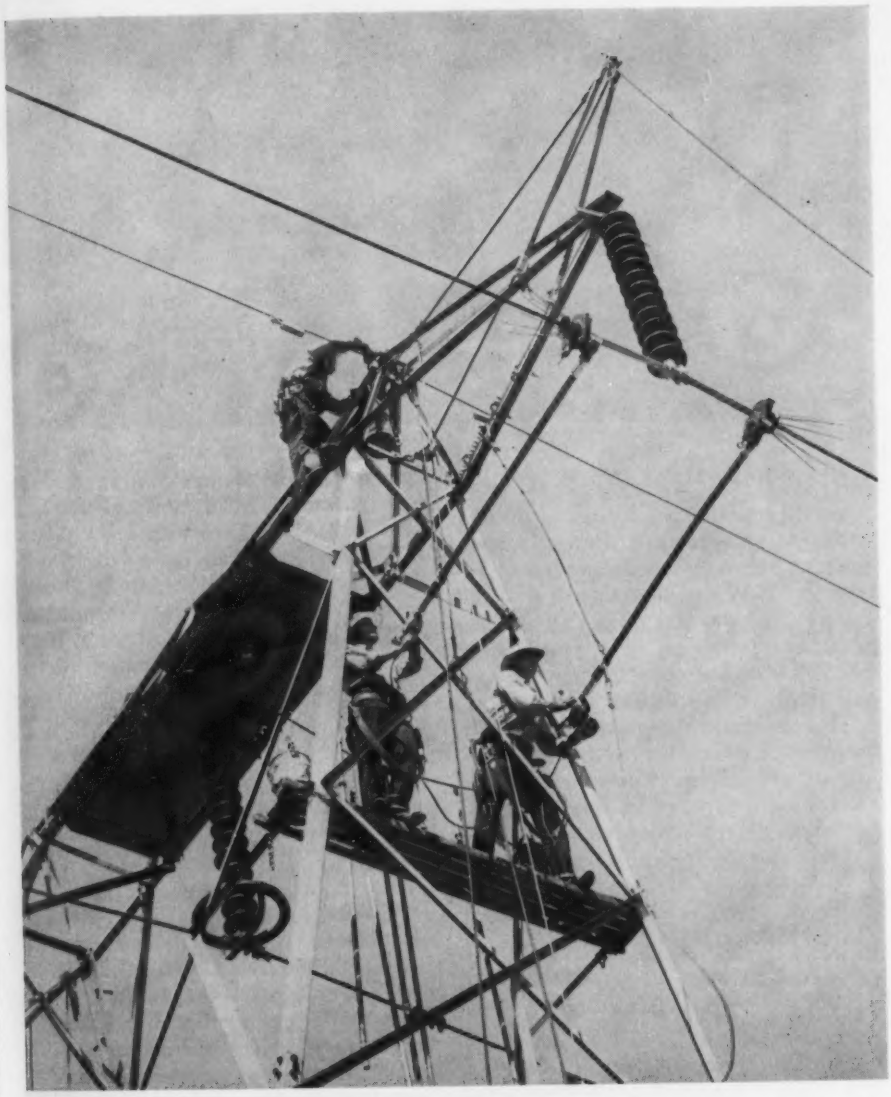
It is anticipated that a 110-kv. transmission station will be placed in oper-



Morgan Hill—Watsonville transmission line of Coast Counties Gas & Electric Co. Shown is a 2-pole straight-line structure in the 14-mile line, to go into service early in 1948. Conductor is 3/0, 7-strand bare copper. System peak reached approximately 38,000 kw., an increase of 17% over peak for 1946

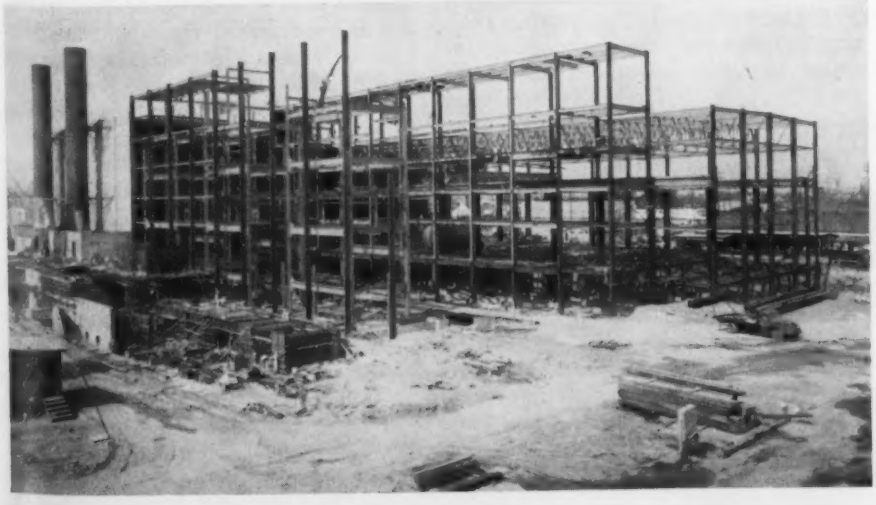
Deaerating heater shell being hoisted to its position on roof of Pasadena power house using two truck-cranes. Construction is part of a 44,000-kw. addition to Pasadena Light & Power Department's present power plant. Included is a new switching station adjacent to the plant for early 1949 operation





Hot-line armor rodding of Southern California Edison company's two, 220-kv. Big Creek lines is part of major rehabilitation program for these lines—first since lines were built in 1925. Crew of 12 men plus a foreman and truck driver is able to complete four towers per day with special hot-line tools

View showing construction progress on second addition to Harbor steam plant of Los Angeles Department of Water and Power. Two 65,000-kw. steam turbine generators are now in service. Expansion will add three 75,000-kw. units. Plant is expected to be completed by spring of 1949



ation early in 1948 and that two additional distribution stations will be constructed.

Additions to transformer capacity in 1948 will total about 34,200 kva. We expect also to add 5 miles of 22-kv. and 2 miles of 60-kv. line to our transmission system, as well as 80 miles of 4-kv. and 10 miles of 12-kv. to the distribution system.—*A. E. Strong, regional manager.*

Glendale P. S. Dept.

Replacement of overhead distribution facilities that have passed their economic life and the addition of another turbogenerator unit have accounted for most of our construction work during the past year. Our 1947-48 budget included an appropriation of $1,300,000 for this work of which about half was spent during the last six months of 1947. We are carrying forward our improvement program as rapidly as material and labor will permit. Our principal objective, as is the case with most utilities, is the replacement of our overhead facilities due to age and small capacity.

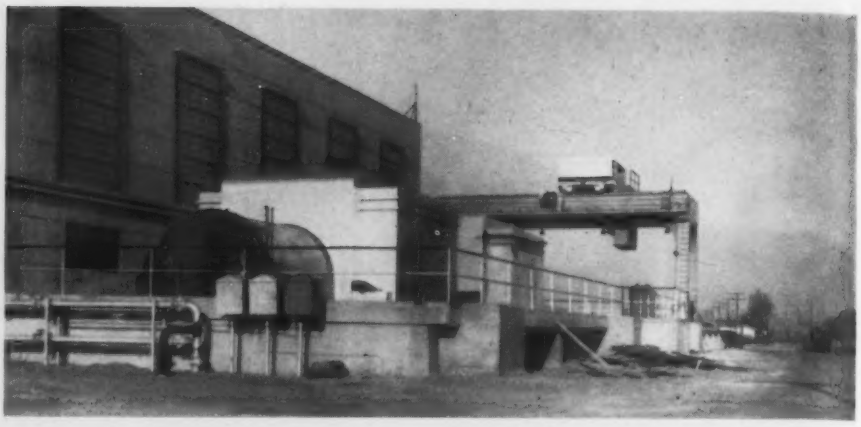
New services and increases in existing loads have required a net addition of 3,100 kva. in distribution transformer capacity, an increase of 50% over 1946. The net increase in meters installed was 1,650. Our peak demand was 33,500 kw., an increase of 11% over 1946, and kilowatt-hour sales were 123,300,000, an increase of 10½%. It is anticipated that our system load will continue to increase during 1948 at about the same rate as experienced during this past year.

During the year, a second 20,000-kw. turbogenerator was installed at our steam plant. This unit was placed in service during October and gives us a generating capacity of 40,000 kw. in addition to approximately 18,000-kw. capacity from Hoover Dam. A 25,000-kva. bank of transformers and a third boiler of 200,000 lb./hour capacity were also installed. No additions to the plant are contemplated for this year.

During early 1948, we plan to start on an underground program which will be on a progressive basis, doing a certain amount each year for an indefinite period. Initially, we will start placing 4,330-volt feeders underground to remove congested overhead lines from main thoroughfares. After main primary feeders are placed underground, we intend to start underground distribution in the central business district to remove existing heavy overhead alley construction.

It is also planned to place about two miles of our 34,500-volt transmission

Second 20,000-kw. outdoor turbogenerator was added during the year by Glendale Public Service Department. New unit gives total generating capacity of 40,000 kw. in addition to 18,000 kw. capacity from Hoover Dam. Peak was up 11% over 1946



lines underground during the year. Three-conductor gas-filled cable is on order for this work.

A 12,000-kva. unit-type supervisory-controlled substation is on order, but due to long delivery time, will probably not be installed before 1949.

Actual increase in peak demands, as well as studies, indicates that by 1950 an additional turbogenerating unit will be required. Some preliminary engineering has been done and indications are that it will probably be another unit of 20,000 kw. capacity. However, at this time definite authorization has not been given by the city council to prepare plans and specifications.—*P. Diederich, general manager and chief engineer.*

Imperial Irrigation District

In 1947 Imperial Irrigation District expended approximately $2,000,000 for new and improved facilities. It is estimated that about $3,500,000 for new facilities will be added in 1948.

A review of 1947 activities shows an additional 34,983 kva. of transformer capacity was added. An approximate 30 miles of 7.2/12-kv., 25 miles of 4-kv., and 30 miles of 16.5-kv. distribution lines were constructed. The number of meters increased by 2,200. Our 1947 system peak was 34,250 kw., an increase of 9.9% over 1946 peak.

Our plans for 1948 include the construction of a 20,000-kw. steam station to be completed early in 1949 at El Centro, Calif.; an additional 37,500 kva. in transformer capacity in transmission substations and 7,500 kva. in distribution substations. A new transmission substation structure will be built at Coachella. Approximately 80 miles of 92-kv. transmission line from El Centro to Coachella will be under construction in 1948, to be completed in 1949. About 40 miles of 7.2/12-kv., 30 miles of 4-kv. and 30 miles of 16.5-kv. lines will be added in 1948. We also anticipate an increase in the 1948 system peak over the 1947 peak of about 10%.

Future planning consists of converting all 16.5-kv. lines in the Coachella area to 7.2/12 kv. An additional 10,000-kw. unit at Drop No. 4 on the All-American Canal will be installed sometime in 1949.—*B. A. Weiss, assistant to executive superintendent.*

Los Angeles Dept. of W. & P.

Construction expenditures of the Department of Water & Power, power systems, for new and improved facilities in 1947 amounted to approximately $13,400,000. The 1948 program has provision of approximately $32,700,000 for construction of new and improved facilities.

The generating capacity of the department was augmented by the placing in service in November of the second main generating unit of 65,000 kw. at the Harbor steam plant. There was no change in transformer capacity at receiving stations. Added capacity at other points on the system was as follows:

Distribution stations	33,400 kva.
Industrial stations	28,700 kva.
Commercial stations	12,625 kva.
Distribution lines	49,220 kva.

A 2.5-mile 138-kv. underground transmission line connecting unit No. 2 at Harbor steam plant with Receiving Station C was completed during 1947. Distribution lines were added as follows:

34.5-kv. overhead	14.5 mi.
4.8-kv. overhead	138.0 mi.
34.5-kv. underground	8.6 mi.
4.8-kv. underground	31.1 mi.

The net increase in meters in service during 1947 was approximately 15,500. The 1947 system generation peak was 753,000 kw., representing an increase of 8.3% over the 1946 figure.

1948 Program

Additional generating facilities will consist of two units of 75,000 kw. each to be added during 1948 at the Harbor steam plant. Underground transmission lines will connect both units to Receiving Station C, one to consist of 2.5 circuit miles of 138-kv., the other 7.5 circuit miles of 34.5-kv. The frequency changer at Receiving Station C is to be separated into two units and new end bells installed for service as condensers; one section to remain at Receiving Station C, the other to be installed at Receiving Station D. Orders have also been placed for 40,000-kva. condensers to be located at Receiving Stations A, D, and F. It is expected that the installation at F will be completed during 1948, but that the Receiving Station A and D installation will extend into 1949. Planned or estimated additions to transformer capacity are:

Receiving stations	60,000 kva.
Distribution stations	35,000 kva.
Industrial stations	30,000 kva.
Commercial stations	9,500 kva.
Distribution lines	55,500 kva.

Distribution lines will include a second 138-kv. underground circuit between Stations B and D of 5.75 miles, and 3.5 miles of 138-kv. underground from the Gramercy Rack to 117th St. Other distribution will include: 34.5-kv.. 15.0 miles of overhead and 29.5 miles of underground; 4.8-kv., 140.0 miles of overhead and 35.0 miles of underground.

On the basis of experienced peaks and load growth, the indicated system generation peak for 1948 will approximate 800,000 kw. Supervisory control will be extended to include control of Station 49 from Receiving Station E and the Gramercy Rack from Receiving Station D. The 1948 program will include load and frequency control at the Harbor steam plant and installation of reactors at receiving stations on the 138-kv. bus and neutral reactors on 138/34.5-kv. power banks.

The program contemplates the placing in service of the fifth unit of 75,000-kw. capacity at the Harbor steam plant early in 1949. The Owens River Gorge project recently authorized will add 112,500 kw. when completed in 1950 and 1951. The total cost of the project is estimated to be $40,526,000, of which approximately $4,250,000 has already been spent in the construction of Long Valley Dam and other hydraulic facilities. Orders have been placed for eighteen power transformers in the amount of approx-

REA Operation—Eleven Western States

State	Cumulative Loan Approvals	1947 Loan Approvals Amount	Estimated Miles	Estimated Consumers	Energized Systems To Dec. 1, 1947 Miles	Consumer	To Dec. 31, 1946 Miles	Consumer
Arizona	5,060,786	2,359,500	552	1,921	762	3,981	726	3,428
California	3,130,429	665,000	316	541	1,718	7,257	1,625	6,909
Colorado	21,838,551	4,736,000	1,954	4,909	9,835	29,200	8,513	25,611
Idaho	7,585,295	1,508,000	507	1,295	3,601	9,436	3,347	8,383
Montana	17,625 298	3,434,000	1,591	1,531	5,785	15,796	4,264	12,994
Nevada	286,000	...	0	0	147	667	142	251
New Mexico	9,289,000	2,877,500	1,906	3,814	2,716	8,426	2,065	6,236
Oregon	11,495,684	1,841,600	657	2,083	4,260	15,019	3,644	12,450
Utah	2,147,000	135,000	31	92	930	3,018	911	2,763
Washington	16,149,611	3,275,000	1,520	3,660	7,384	18,245	6,867	16,895
Wyoming	8,465,600	1,229,000	690	645	3,245	7,732	2,988	6,968
Totals	103,073,254	19,940,600	9,724	20,491	40,393	108,777	35,092	103,251

imately $1,856,000, to be used at the Owens Gorge development, as well as certain of the department's receiving stations.—*C. P. Garman, chief electrical engineer and deputy general manager.*

Modesto Irrigation District

Our major aim has been to place on order and install sufficient transformer capacity to keep ahead of growing demand. During 1947 we spent $407,261 and added 7,500 kva. of transformer capacity, 3.5 miles of 69-kv. and 30 miles of 4- and 12-kv. line. Number of meters increased by 1,534, corresponding to an increase in load of 9%.

Budget of $292,000 for 1948 contemplates an additional 10% increase in system peak, and provides for 5,000 kva. of transformers, 4 miles of 69-kv. and 15 miles of 4- and 12-kv. lines. A preliminary survey will be made of advantages of an underground network system for congested downtown areas. Addition of 7,500 kva. of transformers and four miles of 69-kv. line is planned for 1949.—*C. E. Plummer, chief engineer.*

Pacific Gas and Electric

The totally unprecedented growth of population which the state of California is experiencing in these postwar years is ample explanation for the equally unprecedented construction program which this company has in progress. The system peak for 1947 reached 1,906,200 kw., an increase of 13.4% over the 1946 peak. Total expenditures for electrical construction in 1947 amounted to $80,000,000, as compared with $34,000,000 in 1946 and an estimated total of $120,000,000 for 1948. These figures reflect, in a rather concrete manner, the remarkable growth of population and increase of load in the territory being served by the company.

A number of important additions and betterments, some of them initiated in the past year, will be continued through the current year and on into 1949 and 1950. These are part of the $350,000,000 expansion program, under which approximately 1,000,000 hp. will be added to the generating capacity by the end of 1951. The construction program embraces generation, transmission and distribution in the usual proportions.

Generation

In the steam-electric generating field, the first unit of 75,000 kva. in the new Kern steam plant, under design and construction during 1947, will be brought to completion in the spring of 1948. The installation of a second unit of 100,000 kva. at that plant is still in the design stage. Construction of the extension for Station "P", San Francisco, consisting of two 100,000-kw. turbogenerators, was also in progress during the latter half of 1947. The first of these units is scheduled for operation late in 1948 and the second early in 1949. The only steam-electric generating capacity actually added to the system during 1947 was a 4,375-kw. topping turbine at Station "B", Eureka, driving a generator rated at 9,375 kva.

During the past year, the company's extensive hydroelectric construction program was carried forward. Early in the year a regulating dam and reservoir at Pit No. 1 plant was completed, in effect increasing the peak capacity of the plant 32,000 kw., at a cost of some $940,000.

Construction was started on the replacement of the 45-year-old Electra plant on the Mokelumne River with a new installation of three water wheels totaling 112,500 hp., connected to generators totaling 99,000 kva., a five-fold increase in capacity. Water will be brought to the wheels through 43,000-ft. of flow tunnel 12 ft. by 15½ ft. in cross-section. The cost will be to the order of $15,600,000. Completion is scheduled for the summer of 1948.

Some eleven miles upstream from the Electra project, construction is in progress on the new West Point plant, of 16,000-kva. capacity. This will be in operation in the fall of 1948. The cost is estimated at $4,000,000.

Two large plants are in progress on the North Fork of the Feather. The upper of these at Rock Creek, approximately one mile below the present Bucks Creek plant, will require some 34,500 ft. of 25-ft. horseshoe-shaped pressure tunnel and 1,050 ft. of penstock. The installation will include two vertical turbines driving 63,000-kva. generators. The cost is estimated at $35,400,000. Operation is scheduled for the summer of 1950.

Seven miles downstream from the Rock Creek plant, the construction of the 75,000-kva. Cresta plant is well started, with completion scheduled for the winter of 1949. Water for two 46,500-hp. vertical turbines is being brought through a 26-ft. horseshoe-shaped pressure tunnel, 21,000 ft. in length. The peak flow will be 3,500 cu. ft. per second. The cost will approximate $26,400,000.

Work will be initiated during 1948 on the reconstruction and enlargement of the old Colgate plant on the Yuba River, after 47 years of continuous service. The present capacity of 15,575 kva. will be approximately doubled by a single 35,000-hp. unit replacing the seven old units. This is expected to be in operation in the summer of 1949. Cost is estimated at $3,325,000.

Transmission

During the year 1947, some 375 miles of transmission lines of more than 50 kv. were constructed. In the higher voltages, a major line, 142 miles in length, at 220 kv., was completed last year between Shasta substation and Vaca-Dixon substation at a cost of $3,600,000. An extension of this circuit, 52 miles long, also at 220 kv., on double-circuit towers is under construction between Vaca-Dixon and the new Moraga substation. This involves a long-span crossing of Car-

Work progresses on 43,000-ft., 12x15-ft. flow tunnel that will carry Mokelumne River water to new 99,000-kva. replacement of 45-year-old Electra power plant of Pacific Gas and Electric Co. Five-fold increase in capacity was gained

Foundations for Mission substation of Pacific Gas and Electric Co., major San Francisco project costing $2,865,000

quinez Strait. The cost of this latter line is estimated at $2,267,000. Completion is scheduled for the spring of the year.

A 42-mile, 110-kv., twin-circuit tower line was completed between Winters and Fulton, providing an additional supply into the Santa Rosa area. The cost of this will approximate $870,000.

In order to deliver additional power into the Garberville area, a 66-mile, single-circuit 60-kv., wood-pole line was run from Willits through Longvale to Garberville at a cost of some $684,000.

For the present year it is estimated that 575 miles of transmission lines of more than 50 kv. will be constructed. Foremost of these will be the completion of the 202-mile 220-kv. line from Tesla near Tracy to the newly enlarged Midway substation, at an estimated cost of $6,220,000. In the Midway-Kern steam plant area, some 56 miles of 110 kv. are being constructed as a system tie. The combined cost of these lines will exceed $1,000,000. To provide for delivery of power from the second Kern steam plant unit, two additional 110-kv. circuits will be installed between Kern and Midway substation, a distance of 21 miles, at an estimated cost of $607,000.

A 142-mile, 220-kv. circuit from Shasta substation to Vaca-Dixon is being strung in a spare position on existing towers and will be ready for operation in the spring of this year. An extension to this circuit to Moraga will be completed later in the year. The cost will approximate $1,620,000.

At the northern end of the system an important 110-kv. tie line, 115 miles in length, will connect Shasta substation and Eureka. This is now under construction and will be completed for operation later in the year.

Further transmission improvements in the Kern area will include a single 110-kv. line, 14 miles in length, between the Southern California Edison Co.'s Magunden substation and Kern steam plant.

Of particular interest is the installation of 110-kv. underground transmission cables between Stations "H" and "P", San Francisco, and between Station "H" and the new Mission substation and Station "P" to the same point, a total of 18 circuit miles. This is of the high-pressure gas-filled type consisting of three single-conductor 1,000 MCM paper-insulated cables in somastic-coated steel pipe. Gas pressure and pressure regulating equipment for the cables are installed at each terminating station. This installation, when completed, is estimated to cost $2,865,000. These will be completed before the new units at Station "P" come to operation.

To correspond with increased generating and transmission capacity, new and enlarged substation installations have been under construction at a number of points throughout the system. Moraga substation, a $3,700,000 project in Contra Costa County, receiving its supply from Vaca-Dixon substation, was substantially completed last year. In the Santa Rosa area, the new Fulton substation, stepping down from 110 kv. to 60 kv., was completed last year, replacing the old substation. This cost to the order of $780,000.

Mission substation, now under construction at Mission and Eighth St., San Francisco, is the terminus of the 110-kv. underground cables mentioned above. The estimated cost is $4,800,000. This is scheduled for completion during the winter of 1948. A new 220-kv. switching station, for which $700,000 is appropriated, is under construction at Tesla near Tracy. At the southern end of the system, the new $3,400,000 Midway substation, now under construction, will terminate the 220-kv. transmission from Tesla. This will be completed this summer. Construction is well under way on the 115-kv. Lockford substation, in San Joaquin County. This will serve as an outlet for additional power in the Stockton area. The estimated cost is $770,000.

A considerable number of smaller distribution substations had been completed or were under construction at the close of the year. Work on these will be continued this year, and a number of new substations will be initiated.

Distribution

During 1947 more than 74,000 electric customers were added throughout the system. For 1948, it is anticipated that some 65,000 new customers will be connected.

Distribution lines totaling 3,850 circuit miles, were constructed during the past year, with 3,500 to 4,000 miles of such lines in prospect for 1948. The bulk of this mileage is in rural and suburban lines. Every effort is being made to procure the necessary materials, some items of which still remain in limited stock or on slow delivery.—*I. C. Steele, vice-president and chief engineer.*

Package substation being installed in Power House Canyon to help meet phenomenal load increases on system of San Diego Gas & Electric Co. Transformer capacity of system will be increased by 145,000 kva. during year 1948

City of Palo Alto

Our system experienced a 9.8% increase of peak load. Four and a half miles of distribution lines were built. Installed transformer capacity was increased by 1,470 kw. Eight hundred and ninety new meters were installed representing a growth of 12%. It appears at present that we will experience a similar growth this year.

Construction for 1948 will include approximately five miles of distribution line, completion of an underground distribution system in a residential tract using pole-type transformers housed on pads above ground on rear easements, reconstruction of our substation to install automatic gear, and extension of the distribution system to serve newly annexed territory. Modern street lighting is planned for one mile of major streets. Studies are under way for a long-range program of strengthening our electric system to meet future load growth which will soon exceed the capacity of our present 4-kv. distribution system.—*C. G. Smith, electrical engineer.*

Pasadena L. & P. Dept.

During the fiscal year 1946-47 the department experienced a record year. Energy sold in Pasadena exceeded the previous year by 13.3%. Total operating expense increased 28.9%, which included considerable deferred maintenance. Additions to capital amounted to only $453,336, which was made less than our authorized program called for due to delays in delivery of material and equipment on order.

Work during 1947 included retubing and replacing of refractory in four of the largest boilers at the steam plant. Betterments to distribution system were limited largely to replacing a 3,000-kva. transformer bank at one of the major substations with a 6,000-kva. bank with some minor rebuilding of pole lines. The added distribution transformers in service increased total capacity from 57,035 kva. to 61,239. The number of meters increased from 34,524 to 35,443 in the year.

Revised delivery schedules for materials and equipment will result in capital expenditures for the year 1948 of slightly over $2,500,000.

This will include a portion of the cost of a 44,000-kw. addition to the power plant, and the construction of a new switching station adjacent to the plant. The additional plant capacity will be ready for regular operation early in 1949. During the year 8,000-kva. of transformer capacity will be added at one of the stations, and work at another station will include installation of all new switchgear, increasing its capacity some 40%.

Two 3,000-kva. unit substations will be installed to relieve local conditions before next winter.

We estimate the kilowatt-hour load during the next year will increase approximately 10%, and system demand about 15%.

The years 1949 and 1950 will bring further expansion of substation and distribution capacities, and additional steam plant capacity will be required in 1951.

As is evident in the above brief summary, we are faced with practically the same type of problems experienced by other utilities on the West Coast. Possible new annexations to the city of Pasadena may require an acceleration of our construction program. We do not see any indication of drop-off in load during the next several years. —*T. M. Goodrich, general manager and chief engineer.*

Riverside E. L. & W. Dept.

During 1947 approximately $260,000 was expended for new and improved facilities in the electric department of the city of Riverside. Although to some extent above that anticipated at the beginning of the year, it is in stride with the projected program necessary for capital investment in the operation of the department to supply adequate service to the new and ever-increasing load conditions existing.

Our anticipation for the coming year is that this will reach a level of approximately $400,000 and will in all probability continue at or near this level for several years to come to provide the necessary improvements in the operation of the department.

During 1947 one transformer station was increased in capacity to the extent of 6,000 kva., this station now having a total capacity of 18,000 kva. A third 33-kv. transmission line was installed and placed in service. The transformer station proper belongs to the Southern California Edison Co. and the line as constructed by the city receives energy at the city limits from this company.

The extension of distribution lines as constructed during 1947 totaled approximately six miles, a large percentage being in subdivision development and having a very high ratio of consumers per mile.

The increased load condition is somewhat represented by the comparison of net change in meters being 810 in number above the maximum during 1946, for a total of 15,165 meters now in service.

This year we have found an ever-increasing requirement for and decided advantages of having two-way-radio-controlled units in operation in the department. The department now has eight such units operating, covering emergency calls for many troubles, the routing of service men in this operation, as well as immediate and direct contact with the supervisor class of personnel.

The program for changing approximately 12,000 customers from 50- to 60-cycle supply was completed during the year, following closely the policy established by the Southern California Edison Co. The program was accomplished in three steps with time allowed between to clear up one group and preconvert any necessary equipment be-

fore proceeding with the next group. The Edison company acted as contractor for the city, their contractors acted as subcontractors.

During 1948 no additional transmissions are contemplated. To provide service for an estimated 1,000 new customers, distribution lines will be extended approximately seven miles. This new load plus anticipated increase in consumer consumption will probably amount to an increase in peak demand of about 1,000 kw., the same as last year's increase.

Contemplated improvements beyond 1948 give an indication of the possible utilization of two or more unit-type subs with an interconnecting 33-kv. line, with probabilities of this work starting in 1949, being dependent upon the conclusion of planning and the availability of equipment.—*L. W. Grayson, superintendent.*

San Diego Gas and Electric

The year 1947 was characterized by a continuance of the rapid growth in load that had been experienced by the San Diego company in previous years, particularly in suburban areas. There is at the present time no indication of a diminution of this expansion.

Capital expenditures in the electric department made during 1947 totaled $9,000,000 and the outlook is for an equal expenditure in 1948. In fact the 1948 additions will be greater if deliveries can be secured on the necessary apparatus.

The major improvement involved in the 1947 program was the installation of turbogenerator No. 2 at Silver Gate station, this unit being rated at 50,000 kw. Unfortunately, because of delays in the delivery of the machine, it was not possible to effect its completion in 1947. It is now believed that it will be ready for operation in March 1948. This will once more restore a satisfactory reserve capacity, permitting a reasonable overhaul schedule for other generating units.

The expansion of transformer capacity during 1947 totaled 93,000 kva. Forty-three miles of 66-kv. transmission lines were built and new distribution lines totaled 242 miles.

The net increase in active electric meters was somewhat in excess of 10,000.

The system peak for the year was 202,000 kw., an increase of 14% over 1946. This peak was very close to the total capacity available, including power purchasable from other companies.

The largest project contemplated for 1948 aside from the completion of the Silver Gate turbine, is an extension to the company's 66-kv. network as required by the continued growth in suburban and rural areas. This drift of the newer population toward the back country has been a notable tendency since the end of the war and has resulted in overloading all of the company's peripheral facilities. It is expected that close to $4,000,000 will be expended in expanding the 66-kv. system, which is beginning to take on the aspects of a high-voltage distribution network.

During 1948 the transformer capacity of the system will be increased by 145,000 kva.; the transmission line by 100 miles or more; and the distribution system by 250 miles of line.

An increase in the peak load of 1948 over 1947 of about 12% is estimated.

The company has already placed an order for an additional 50,000-kw. turbogenerator to be delivered in the spring of 1950, this comprising the third unit at Silver Gate station. Taking cognizance of the increasing cost of fuel, the new unit will be built for 1,250 psi. 950 deg., whereas the prior units in this station have been 850-psi. 900-deg. machines.

The company still has a considerable backlog of electric customers awaiting service, to the number, in fact, of 4,000. Most of these are in suburban areas where line extensions of considerable length are required to reach them. The delays, as in the past, have been the result of a shortage of skilled workers and some distribution equipment, especially transformers.

In summary, it may be said that the principal problems of 1948 will be the expansion of production, trans-

Current and Future Power Development on Bureau of Reclamation Projects

Project	State	River	Purpose	Name of Plant	Year Initial Operation	Initial kw.	Present No. of Units	Ultimate kw.	Ultimate No. of Units
Boise	Idaho	So. Fork Boise	F.C., Irr., P.	Anderson Ranch	1949	27,000(2)	2	40,500(3)	3
Boulder Canyon	Ariz.-Nev.	Colorado	F.C., Irr., P.	Hoover	1936	1,034,800(4)	15(5)	1,322,300	19(6)
Central Valley	California	Sacramento	F.C., Irr., P.	Keswick	1948	75,000(7)	3	75,000	3
Central Valley	California	Sacramento	F.C., Irr., P.	Shasta	1944	229,000(4)	5(8)	379,000	7(9)
Colo.-Big Thompson	Colorado	Power Conduit No. 1A	Irr., P.	Estes	1949	45,000(10)	3	45,000	3
Colo.-Big Thompson	Colorado	Power Conduit No. 1	Irr., P.	Mary's Lake	1949	8,100	1	8,100	1
Colo.-Big Thompson	Colorado	Power Conduits	Irr., P.	Six plants	Indefinite	(11)	(11)	101,200(11)	(11)
Columbia Basin	Washington	Columbia	F.C., Irr., P.	Grand Coulee	1941	776,000(4)	9(12)	1,974,000	21(13)
Davis Dam	Ariz.-Nev.	Colorado	F.C., Irr., P.	Davis	1949	225,000(14)	5	225,000	5
Hungry Horse	Montana	So. Fork Flathead	F.C., Irr., P.	Hungry Horse	Indefinite	(11)	(11)	300,000(11)	(11)
Missouri Basin	Wyoming	Big Horn	F.C., Irr., P., Silt	Boysen	1950	15,000(15)	2	15,000	2
Missouri Basin	Montana	Missouri	F.C., Irr., P.	Canyon Ferry	1951	36,000(16)	3	36,000	3
Missouri Basin	N. Dakota	Souris Canal	Irr.	Crosby	Indefinite	(11)	(11)	72,000(11)	(11)
Missouri Basin	N. Dakota	Souris Canal	Irr.	Des Lacs	Indefinite	(11)	(11)	72,000(11)	(11)
Missouri Basin	Wyoming	North Platte	F.C., Irr., P., Silt	Glendo	Indefinite	(11)	(11)	15,000(11)	(11)
Missouri Basin	Wyoming	North Platte	P.	Kortes	1949	36,000(16)	3	36,000	3
Missouri Basin	S. Dakota	James R Extension Canal	Irr.	Miller	Indefinite	(11)	(11)	144,000(11)	(11)
Missouri Basin	Montana	Big Horn	Irr., P.	Yellowtail	Indefinite	(11)	(11)	125,000	4(17)
Palisades	Idaho	Snake	F.C., Irr., P.	Palisades	Indefinite	36,000(18)	2(11)	54,000(19)	
						(11)		(11)	3(11)
Shoshone	Wyoming	Shoshone	P.	Heart Mountain	1948	5,000	1	5,000	1

(1) F.C. = Flood Control; Irr. = Irrigation; P = Power; Silt = Silt Control
(2) 2—13,500 kw.
(3) 3—13,500 k.w.
(4) As of Dec. 31, 1947
(5) 12—82,500 kw., 1—40,000 kw., 2—2,400 kw.
(6) 15—82,500 kw., 2—40,000 kw., 2—2,400 kw.
(7) 3—25,000 kw.
(8) 3—75,000 kw., 2—2,000 kw.
(9) 5—75,000 kw., 2—2,000 kw.
(10) 3—15,000 kw.
(11) Design not definitely decided
(12) 7—108,000 kw., 2—10,000 kw.
(13) 18—108,000 kw., 3—10,000 kw.
(14) 5—45,000 kw.
(15) 2— 7,500 kw.
(16) 3—12,000 kw.
(17) 4—31,250 kw.
(18) 2—18,000 kw.
(19) 3—18,000 kw.

Current and Future Transmission Lines on Bureau of Reclamation Projects

Project	State	Designation of Line	Voltage in kv.
Boise	Idaho	Anderson Ranch to Mountain Home..	115
Boise	Idaho	"C" Line pumping plant to Black Canyon power plant.....	69
Boulder Canyon	Nev.	Nevada State switchyard to Boulder City substation	69
Central Valley	Calif.	Contra Costa substation to Clayton and Ygnacio pumping plants.....	69
Central Valley	Calif.	Shasta to Keswick.....	13.8
Central Valley	Calif.	Oroville to Elverta to Tracy.....	230
Central Valley	Calif.	Keswick to Elverta to Tracy.....	115
Central Valley	Calif.	Tracy to Contra Costa.....	69
Central Valley	Calif.	Keswick Tapline (2).....	230
Central Valley	Calif.	Shasta to Cottonwood, Gas Pt. Rd. (2) and Shasta sub-connection.....	230
Colorado-Big Thompson	Colo.	Brush to Sterling.....	115
Colorado-Big Thompson	Colo.	Granby pumping power supply.....	69
Colorado-Big Thompson	Colo.	Sterling to Holyoke.....	69
Colorado-Big Thompson	Colo.	Troublesome substation to Kremmling	13.8
Colorado-Big Thompson	Colo.	Loveland to Greely.....	115
Colorado-Big Thompson	Colo.	Brush to Akron to Yuma.....	69
Colorado-Big Thompson	Colo.	Greeley to Brighton.....	115
Colorado-Big Thompson	Colo.	Loveland to Longmont.....	69
Colorado-Big Thompson	Colo.	Estes to Mary's Lake and Estes to Granby	115
Columbia Basin	Wash.	Pasco pumping power supply.....	13.8
Davis Dam	Ariz.	Kingman to Davis (const. pwr. line)..	69
Davis Dam	Ariz.	Davis to Parker.....	230
Davis Dam	Ariz.	Davis to Prescott.....	230
Davis Dam	Ariz.	Parker to Gene.....	230
Davis Dam	Ariz.	Davis to Phoenix.....	161
Davis Dam	Ariz.	Tucson to Cochise.....	115
Davis Dam	Ariz.-N. Mex.	Cochise to Deming.....	115
Davis Dam	Ariz.	2nd Phoenix to Tucson.....	115
Davis Dam	Ariz.	1st Phoenix to Tucson (overhead gnd. wire only)	115
Davis Dam	Ariz.	Prescott to Phoenix.....	230
Davis Dam	Ariz.	Phoenix to Mesa (double circuit).....	115
Davis Dam	Ariz.	2nd Parker to Gila.....	161
Davis Dam	Ariz.	Extensions to Yuma system.....	34.5
Davis Dam	Ariz.	Coolidge to E.D. No. 5 crosstie.....	115
Davis Dam	Ariz.	Mesa substation to Coolidge.....	115
Davis Dam	Ariz.	Davis to Hoover.....	230
Fort Peck	Mont.	Fort Peck to Williston.....	115
Fort Peck	Mont.	Glendive to Miles City.....	115
Fort Peck	Mont.	Fallon pumping power supply.....	57
Fort Peck	Mont.	Fallon relift pumping power supply..	57
Fort Peck	Mont.	Northern Electric Co-op line.....	34.5
Fort Peck	Mont.	Savage pumping power supply.....	57
Fort Peck	Mont.	Havre to Shelby.....	115
Gila	Ariz.	Gila-Welton-Mohawk pumping power supply	34.5
Hungry Horse	Mont.	Government Camp.....	13.8
Kendrick	Wyo.	Seminoe to Casper to Kortes.....	115
Kendrick	Wyo.	Medicine Bow to Sinclair to Hanna...	34.5
Kendrick	Wyo.	Casper to Thermopolis.....	69
Missouri Basin	Wyo.	Boysen to Pilot Butte tap.....	34.5
Missouri Basin	Mont.	Williston to Garrison.....	115
Missouri Basin	Neb.	Gering to Northport to Sidney.....	115
Missouri Basin	Colo.-Neb.	Sterling to North Platte.....	115
Missouri Basin	Neb.-S.Dak.	Gering to Hot Springs.....	115
Missouri Basin	Wyo.-Colo.	Cheyenne to Sterling.....	115
Missouri Basin	Wyo.-Neb.	Casper to Gering.....	115
Missouri Basin	S.Dak.-Neb.	Fort Randall to O'Neill.....	115
Missouri Basin	Wyo.	Glendo to Lusk.....	115
Missouri Basin	Wyo.	Garland to Lovell.....	69
Missouri Basin	Wyo.-Mont.	Lovell to Yellowtail.....	115
Missouri Basin	Wyo.	Boysen to Thermopolis.....	69
Rio Grande	N. Mex.	Alamogordo to Hollywood.....	115
Rio Grande	N. Mex.	Elephant Butte to Socorro.....	115
Rio Grande	N. Mex.	Socorro to Albuquerque.....	115
Shoshone	Wyo.	Heart Mountain to Garland.....	69
Yakima	Wash.	Roza Div. pumping power supply.....	34.5

mission and distribution facilities to provide for the ever-growing load imposed by both new and old customers, and the raising of the funds, through the issuance of new securities, requisite to carrying out this program. Increasing unit costs of structures and equipment continue to impose serious problems in connection with future rate structures.—*L. M. Klauber, president.*

Southern California Edison

In 1947 we spent approximately $54,000,000 for additions to generating capacity and new substations, transmission lines, distribution lines, and additions to system facilities.

We have budgeted for system betterments $70,000,000 for 1948. This does not include $12,000,000 for the completion of the conversion of the system and consumers equipment from 50 to 60 cycles.

It was expected that the two units in the Redondo steam plant would be ready for operation in 1947, but they will not be ready for service until the early part of 1948. The same thing is true of the fourth unit at Big Creek No. 3. These three units will add approximately 165,000 kw. additional generating capacity to the system in 1948.

In the early part of the year we learned of an old steam unit which had been removed from service to make room for a new one. This unit was purchased and installed in Long Beach No. 2 plant, obtaining steam from the boilers in No. 1 and No. 2 steam plants. This unit was installed in record time as it was just one hundred days from the time we purchased it until it was in service and carrying load.

During 1947 21 new substations were constructed and put into service. The transformers installed in these new substations together with those added to existing stations total 235,000 kva.

During the year, 1,027 miles of line were constructed, of which 394 miles were transmission and distribution lines of 11 kv. or higher, and 430 miles were rural lines. No important additions were made to the major transmission lines.

Approximately 68,000 new customers were connected to our lines during the year with a net increase in connected load of 500,000 hp.

The year 1947 was the biggest year experienced in the company's history in the building of lines, construction of new substations, and service to new customers. This was accomplished notwithstanding the difficult manpower and material situations.

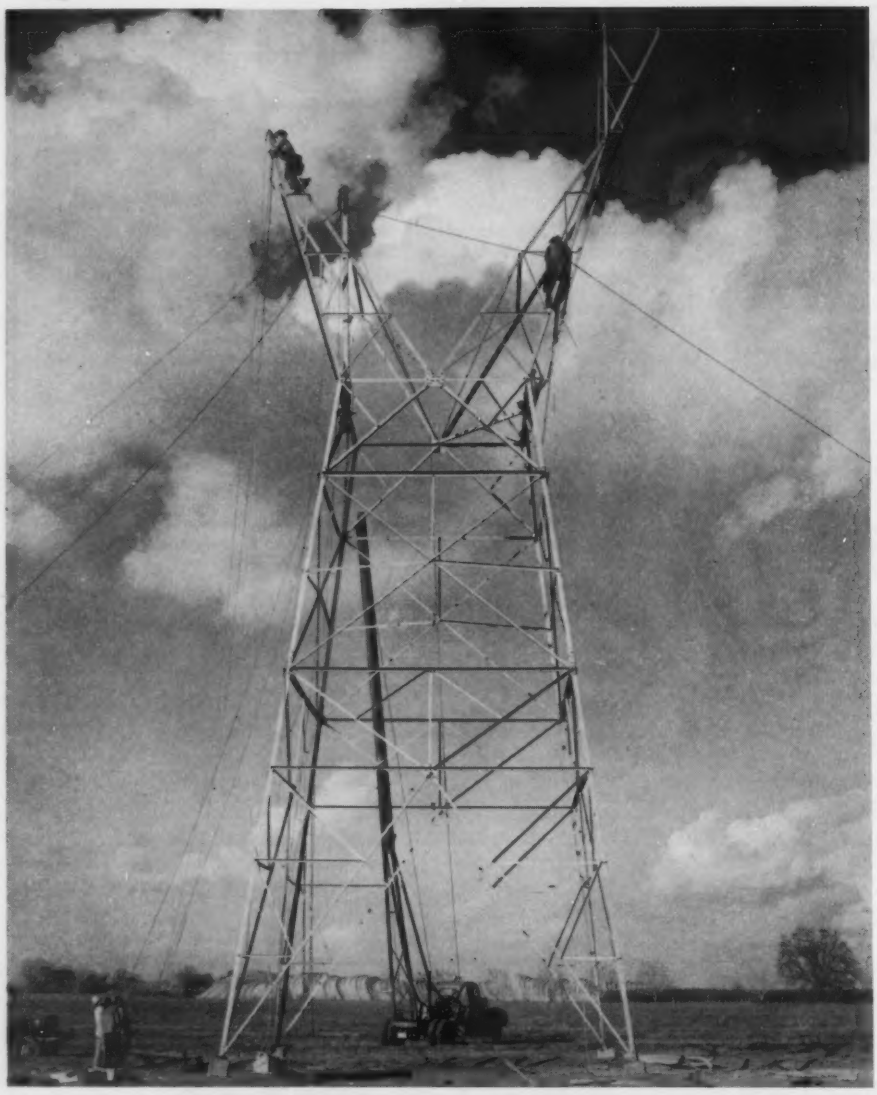
Our linemen's training school was active all during the year.

In additon, we employed an average of 50 contractor's crews for the constructon of transmission and distribution lines.

During the year we installed approximately 75,000 kva. of capacitors in substations and on distribution lines, to improve the power factor on the substation transformers and the regulation on the distribution system.

During the latter part of 1947 the old wooden flume at the Kaweah No. 1 plant, which was constructed in 1898, was completely replaced with a new Lennon-type flume.

The original Big Creek lines were constructed in 1913. The voltage of these lines was raised to 220 kv. in 1923. When these lines were built, nothing was known about transmission line vibration, and protective measures were not taken until many years later. Early this year we started on a program of installing armor rods on the conductors at the insulator supports. Due to the fact that the load was such that we could not take the lines out of



Riggers erecting steel tower on Oroville-Sacramento 230-kv. line of USBR Central Valley Project. Line will bring Shasta Dam Power as far as Sacramento

service, special tools were designed for the application of the armor rods and for the handling of the conductors with the lines energized. This work will be completed in the early part of 1948.

The frequency change program has been carried on continuously during the year and approximately 45% of the consumers and 55% of the horsepower has been converted from 50 to 60 cycles. It is expected that the conversion will be completed by the end of October 1948.

Plans for 1948 contemplate the completion of two 220-kv. major substations, one in the San Joaquin Valley, and one in southern California adjacent to the metropolitan area.

In addition, 37 new transmission and distribution substations are scheduled for 1948.

Substation transformer capacity for these 39 substations totals 775,000 kva. In addition, 175,000 kva. of transformer capacity is on order to supply additional synchronous condensers on the system.

It is expected we will construct 475 miles of 11 kv. and higher, transmission and distribution lines of which 150 miles will be rural lines.

Present indications are that we will connect approximately 70,000 new consumers in the new year.

All the equipment is on order and engineering work is proceeding for the installation of two additional 66,000-kw. units at Redondo steam plant. It is expected that these will be ready for service in the early part of 1950.—*N. B. Hinson, vice-president and executive engineer.*

Turlock Irrigation District

Expenditures of $348,000 during 1947 included construction of 14 miles of 66-kv. and 25 miles of 11-kv. lines, with addition of 1,600 meters and increase of 6% in system peak. Developments of interest included a 66-kv. interconnection with an adjacent system, modernization of a main substation and installation of some meta-metering.

System peak for 1948 is expected to be about 6% greater than 1947. Budget of $202,000 will provide for completion of modernization of substations, partial construction of a new substation, and construction of 25 miles of distribution line.—*L. H. Parker, electrical engineer.*

Colorado

Colorado-Big Thompson, USBR

In 1947 the first water was diverted through the Alva B. Adams tunnel to the eastern slope of the Continental Divide. Construction continued on Granby Dam and Horsetooth reservoir. Contracts for construction of Mary's Lake and Estes power plants were awarded and work was started. Construction of the Brush-to-Sterling and Sterling-to-Holyoke transmission lines was advanced and completion of the lines is expected early in 1948. Construction is scheduled to start in 1948 on the Loveland-to-Greeley, Greeley-to-Brighton, Loveland-to-Longmont, and Estes-to-Mary's Lake, and Estes-to-Granby transmission lines. Construction work on the North Poudre supply canal and pumping plant is planned for 1948.

Colorado Central Power

Colorado Central spent $610,000 for new and improved facilities in 1947, and has budgeted $650,000 for 1948. Total additions to the system included 6,300 kva. of transformer capacity, 3,000 kva. of which was in two 13,200-2,400/4,160 Y substations, and construction of 182 miles of distribution lines. Portions of the system, which carried a peak 9.4% greater than 1946, are being converted from 2,400 to 4,160 volts, and 325 kva. of capacitors were added for the first time.

Construction planned for 1948 embraces 193 miles of distribution lines, 2,000 kva. of transformer capacity and extension of the mobile radio system to all districts. System peak is expected to rise another 10%.

Long-range plans include installation of four more substations of 1,000-1,500 kva., and conversion of all distribution to 2,400-4,160 volts. A 7,200-volt line from Ft. Lupton to Keenesburg will be converted to 44,000 volts, and existing 13,200-volt lines of small capacity in

the Englewood and Golden districts will be reconductored. Capacitors will be added as study indicates, and some method of water-heater control will be installed. Expenditures for 1949-50-51 will probably amount to $1,500,000, part of which may be for office and warehouse buildings.—*J. E. Wilson, vice-president.*

Colorado Springs P. U. Dept.

About $240,000 was spent in 1947 for improved facilities all of a minor nature, and $1,850,000 is budgeted for 1948 even though it can not all be spent in that time. About 2,600 kva. in transformer capacity and 750 meters were added to the system, which carried a peak of 18,100 kw., an increase of 11% over 1946.

In 1948, 2,500 kva. in distribution transformers will again be added and distribution lines reinforced. Plans call for 10,000 kw. addition of steam generation to be completed in 1949.—*F. H. Wiley, superintendent, electric division.*

Frontier Power

We spent $56,000 for new and improved facilities in 1947, and during 1948 plan to spend approximately $300,000. During 1947 minor improvements were made in the transmission and distribution systems by means of such items as replacing obsolete oil circuit breakers and lightning arresters with up-to-date equipment, and similar operations were, and are being carried on at important industrial substations supplying coal mines operating in our territory. Only a small amount of distribution lines were installed during the year.

Number of meters in service showed an increase of 460, equal to 5½%. The 1947 system peak was 10,100 kw. This represents a 6.3% increase over 1946. An increase of approximately 8% is anticipated for the 1948 system peak over 1947.

During 1948 we hope to increase the town of Walsenburg distribution substation capacity to 1,500 kva. by the addition of a complete new substation. Plans are under way and orders placed for the installation of a 50,000-lb.-per-hour coal-fired steam generating unit in our Walsenburg generating station.

No important changes in transmission and distribution lines are scheduled.—*Paul M. Brown, electrical superintendent.*

Public Service of Colorado

Lack of materials affected construction projects in 1947, but not as greatly as in the previous year. Generating plant additions and transformer installations were probably most seriously affected. Dollar volume of construction is expected to reach $7,250,000 for 1947. Construction budget for 1948 will approximate $8,000,000.

Only half of the contemplated 10,000-kw. additional generating capacity went on the line in 1947, the addition being a 5,000-kw. unit at the Alamosa steam plant. Work of refacing Barker Dam was completed and the reservoir filled in the early summer so that Boulder hydro plant is now operating on its usual schedule. During the year there was added 35,000 kva. of substation transformer capacity, approximately 290 miles of distribution lines and about 10,000 additional electric customers or 67% more than anticipated last year at this time. South Denver terminal was tied into the 110-kv. transmission system.

Work is progressing on the 35,000-kw. addition to Lacombe station in Denver, and the new unit should be supplying the "central" system in 1948. Fifty-four miles of 110-kv. transmission lines will be added in 1948, 95,000 kva. of transformer substation capacity and 300 miles of distribution circuits. It is estimated that 7,500 customers will be added. Plans are already under way for 80,000 kw. of additional generating capacity to be added in 1950-51.—*M. M. Koch, vice-president.*

Southern Colorado Power

Expenditures of $1,506,620 for new and improved facilities in 1947 will be nearly doubled to $2,882,716 budgeted for 1948. Addition of 1,343 meters with an increase of 23.6% in system peak will be overshadowed by an anticipated increase of 53% in 1948.

Completion of a 15,000-kw. plant in Pueblo, and construction of 30 miles of distribution line in addition to the 60 miles added in 1947, along with a total of 31,500 kva. of transformer capacity in the two years, will help carry the heavy increase. If present load trends continue, another generating unit will be required by 1950.

Engineering has been completed and equipment ordered for a 40-mile, 69-kv. transmission line using high-speed reclosing circuit breakers with carrier-current relaying installed in the power plant at each end of the line. A large cement mill located about the middle of the line will also be equipped with the high-speed reclosing circuit breakers to trip on lightning flashovers and reclose in 20 cycles.

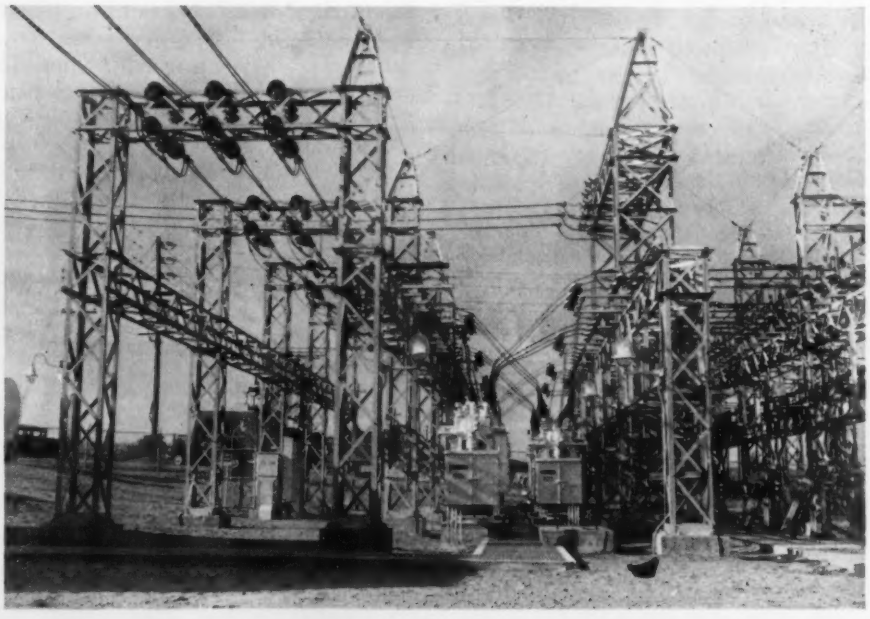
Mobile communication between vehicles, offices and power plants was established, with installation of a radio tower at a high point near Pueblo.—*M. G. Lord, vice-president in charge of operation.*

Idaho

Idaho Power

Idaho Power company's construction program for 1947 was the largest in its history, amounting to approximately $11,000,000. Its program for 1948 is even larger, the budget totaling approximately $14,500,000.

During 1947 one hydroelectric



South Denver terminal substation completed during 1947 is part of master plan for serving Denver embracing a loop 110-kv. line with other major subs

power plant of 16,500-kw. capacity was placed in operation and the construction work progressed on the installation of three other hydroelectric power plants totaling 80,700 kw. In addition, field investigation work was under way for one more power plant with a capacity of 69,000 kw.

Substation transformer capacity added during the year amounted to 666 kw.

Ninety-six miles of 69-kv. transmission lines and 760 miles of distribution lines were added during the year.

A total of 7,975 customers was connected and the system peak load increased 27,000 kw. to a total of 155,000 kw.

During the year a short-wave radio dispatching installation was made and 17 cars equipped with communication facilities.

Approximately 5,000 kva. of static capacitors were added at various points on the distribution lines to bolster up service conditions.

During 1948 it is expected that two Malad River power plants, of 7,200 and 13,500 kw. capacity, respectively, will be placed in service; and two of the new 15,000-kw. units of the Lower Salmon power plant, now under construction, will be completed. The remaining two units of this station will not be ready for operation before 1949. Work will progress on an additional power plant in the Hagerman Valley, which is planned for service in late 1949 and early 1950.

During the year approximately 70,000 kva. of much needed substation transformer capacity is expected to be added to the system.

Approximately 35 miles of 138-kv., 42 miles of 69-kv., and 5 miles of 46-kv. transmission lines will be added.

It is also expected that between 600 and 700 miles of distribution lines will be constructed.

The anticipated peak load for 1948 is approximately 175,000 kw.

Because of the rapidly increasing construction costs experienced during the past several years every effort will be made to develop new ideas tending towards a more efficient manner of providing electric service.

The future in southern Idaho and eastern Oregon looks bright and we anticipate a continued above-normal load growth for the next several years. —*B. C. Russell, general superintendent.*

Boise Project, USBR

Anderson Ranch Dam, highest earth-filled embankment in the world, was brought to its completed height of 456 ft. during 1947, and work was in progress on concrete structures. Bids are being received for remaining construction work, and installation of generating units is scheduled to begin in the fall of 1948. Construction of Anderson Ranch switchyard, the Anderson Ranch-Mountain Home transmission line, and Mountain Home substation is also scheduled to start during the latter part of 1948. Construction of "C" Line canal pumping plant progressed during 1947 and is scheduled for completion during 1948.

Montana

Hungry Horse Project

During 1947 construction started on the government camp and an access road. A contract for excavation for the diverson tunnel was awarded in October 1947, and it is expected that during the first part of 1948 a contract will be awarded for the construction of Hungry Horse Dam and power plant. The dam is to be a concrete structure approximately 250 ft. in height and 2,100 ft. in length. The power plant will house four 75,000-kw. generators.

Nevada

Sierra Pacific Power

Sierra Pacific Power Co.'s electric department spent $1,300,000 for new and improved facilities in 1947; $1,500,000 is budgeted for 1948.

In 1947 line transformer capacity was increased 19%; 37 miles of 60-kv. line were built between Golconda and Battle Mountain, Nevada; 110 miles of distribution lines (2.4 kv. to 23 kv.) were built, of which five miles were urban. The net increase in number of meters was 2,700, or 12%. System peak in 1947 was 38,900 kw. an increase of 17.7% over 1946.

No unusual items are projected for 1948. Program includes 15 miles of 60-kv. line; conversion of seven miles of 23 kv. to 60 kv. It is expected that load growth and miles of distribution lines built will be somewhat less than in 1947. Increase in system peak over 1947 is estimated at 10%.

The program for the next two or three years contemplates only the usual additions in substation and feeders, as required. Required increase in system power supply will be met by purchase, plans being under way for a third line interconnecting with Pacific Gas and Electric Co.—*V. D. Armstrong, engineer.*

New Mexico

P. S. of New Mexico

During 1947 approximately $1,897,500 was spent for capital additions and $1,977,000 has been budgeted for the year 1948.

We replaced practically all the switchgear in our Albuquerque power house, installing new air circuit breakers and new switchboard. This replaced oil circuit breakers and switchboards, some of which were over 30 years old.

We cut into service a new 6,000 kw. turbogenerator and boilers in our Albuquerque plant in 1947. Approximately 10,000 kva. in distribution transformers were added, along with two outlying distribution substations, one of 7,500-kva. capacity and the other of 2,000-kva. capacity. Approximately 25 miles of rural distribution lines and 15 miles of urban distribution lines were constructed.

Net addition of approximately 5,100 meters gave a system peak of 29,600 kw. on our Albuquerque-Santa Fe system, which was an increase of 18.6% over 1946. This system peak does not include our Las Vegas and Deming properties which are not integrated with the Albuquerque-Santa Fe system. During 1947 we added 3,600 kva. in capacitors, which were distributed over our distribution system.

We will cut into service a 1,500-kw. turbogenerator at Las Vegas early in 1948, and an 11,500-kw. turbogenerator at our Albuquerque plant either late in 1948 or early in 1949, depending upon delivery. We anticipate installing approximately the same kva. in distribution transformers in 1948 as we did in 1947 namely, approximately 10,000. Addition to distribution line mileage should be approximately the same in 1948 as in 1947, with an increase of 13.5% in peak demand. We have tentatively budgeted approximately $2,000,000 for capital additions in 1949 and $1,750,000 for capital additions in 1950.—*E. M. Conwell, general superintendent.*

Oregon

Bonneville Power Administration

Indicative of 1947 operations of the Bonneville Power Administration was the peak of 1,466,000 kw. (25% above rated generating capacity) carried on Dec. 10 by Bonneville and Coulee. Delivery of 9,238,000 kwh. during the year brought in revenue of $22,010,000, up 31% and 27% respectively

over 1946, and somewhat higher than was anticipated a year ago. This increase was accounted for in part by a noticeable shift in load, the aluminum industry again nearing full production and public and private utilities picking up in consumption of power as shipbuilding and military loads eased off.

Expenditures during 1947 amounted to $16,369,000, and approval of the present budget before congress will increase that figure to an estimated $19,000,000 for 1948.

Generating capacity, which had remained static since removal of two 75,000-kw. units for Shasta, was increased by operation of 108,000-kw. unit No. 7 at Coulee beginning in October. This will be further augmented by addition of 240,000 kw. of peak generation in 1948, and 375,000 kw., including 15,000 kw. at Anderson Ranch during 1949.

Further additions to the transmission system totaled 333 miles—103 at 230 kv. and 230 at 115 kv. More than 300 miles will be added in 1948. Major construction during the year included completion of 30.5 miles of 230-kva. line between Coulee and Foster Creek. Important additions to the 115-kv. system included 19.5 miles between Ephrata and Moses Lake, Wash., and 25.1 miles between Midway and Grandview. On Aug. 1 the administration and the British Columbia Electric Co. completed construction of a 230,000-volt line linking the two power systems at Blaine. Wash. Originally undertaken as a wartime project to assist Canadian production, the line is now utilized under a joint agreement permitting the flow of excess power, when available, to and from Canada. The Presidential permit under which the project was undertaken specifically prohibits use of the line "so as to impair the sufficiency of electric supply within the United States." In conformity with the requirement, only that amount of power has thus far been moved into Canada which was available chiefly during off-peak hours and on weekends when it otherwise would have been wasted because there was no use for it in the Pacific Northwest states. Upon completion of new generation facilities in Canada, it is expected that considerable surplus Canadian power will flow into the U. S. until such time as it can be utilized more fully by Canada's industries.

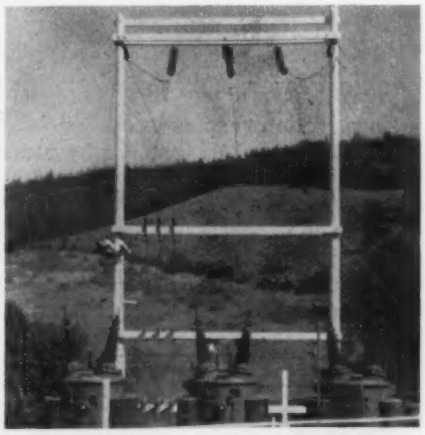
Short-term contracts (one year) have been executed with seven major private and municipal utilities of the region providing for delivery of 390,000 kw. Companies are Pacific Power and Light, Washington Water Power, Portland General Electric, Puget Sound Power and Light, Mountain States Power, Seattle City Light and Tacoma City Light. Long-term agreements desired by these companies were refused on the grounds that such contracts would have committed for a considerable period power to which public agencies have preference under provisions of the Bonneville Project Act. Arrangements have been completed for taking care of an expansion of the power requirements of the Atomic Energy Commission at Hanford, Wash.

With the addition of the 108,000-kw. unit mentioned above, it is expected that the area will be able to ride through the year to come if nothing unforseen occurs. Continued rapid growth of load in the Pacific Northwest, however, indicates the urgency of continued installation of new generation not only in existing federal plants, but municipal and privately owned plants as well.

California Oregon Power

Approximately $3,250,000 was spent for new and improved facilities during 1947; $4,376,000 has been budgeted for 1948, the larger amount being mainly due to construction work in connection with the new 27,000-kw. hydroelectric plant on the North Umpqua River at Toketee Falls, Ore.

Approximately 90% of the 60-mile 66-kv. transmission line between Lakeview, Ore. and Alturas, Calif., was constructed during 1947, lack of material being the reason for not entirely completing same. Several short lengths of 66-kv. transmission line were also constructed in order to improve conditions to new load areas. Approximately 19,000 kva. of distribution transformers and 20,630 kva. of substation transformers were installed during 1947. A total of 13 miles of transmission line above 11 kv., and 242 miles of rural and 16 miles of urban distribution line was constructed.



Rural construction was active on the California Oregon Power Co. system

The meter requirement for 1947 approximated 10,200. We began the year with some 2,900 non-metered services and ended with approximately 4,500, but hope to clear up the problem of non-metered services this coming year. We experienced a 13% increase in retail customers. The 1947 system peak, including wholesale and retail sales, was 155,000 kw., being an 8.4% increase over 1946. However, the retail peak of 116,990 kw. showed a 27% increase, which made it necessary to drop some wholesale deliveries to meet increased regular system requirements.

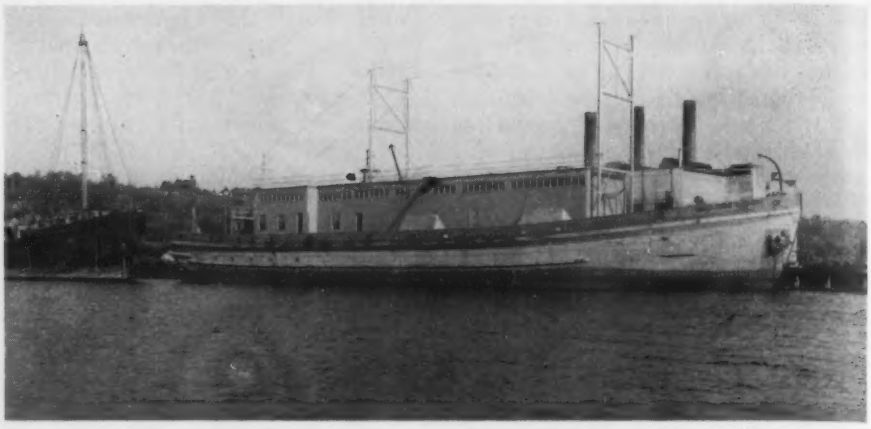
During the year approximately 14,000 kvar. in capacitors were added to distribution facilities. The municipally owned distribution systems of Canyonville and Myrtle Creek, Ore., were acquired in 1947.

The year 1948 will see the active prosecution of construction of the new hydroelectric plant on the North Umpqua River at Toketee Falls, which now calls for an initial installed capacity of 27,000 kw. and ultimate of 40,000 kw. The necessary access roads and two camps have been constructed, and active boring of the 5,600 ft. long tunnel has begun. The 60-mile 66-kv. transmission tie line between Alturas and Lakeview will be completed early this year. Additional substation capacity of 28,000 kva., which includes a 1,500-kva. portable-type substation, is anticipated, together with 20,000 kva. in distribution line transformers.

Approximately 90 miles of 66-kv. transmission line are expected to be put into service during 1948, which includes the 60-mile Lakeview-Alturas portion not completed during 1947. At least 250 miles of rural distribution and 15 miles of urban distribution are anticipated for 1948.

The system peak is expected to increase approximately 8% or to a total of 167,000 kw. A very large portion of load increase continues to come from the lumber manufacturing industry and to date there is little sign of abatement.

For future requirements beyond the new year, we contemplate bringing in Toketee plant of 27,000 kw. initial capacity in 1949, together with some 47 miles of 125-kv. transmission line from the plant to Dixonville, near Roseburg, Ore. After that the next step will be to bring in the third unit, bringing the total installed capacity to 40,000 kw., together with additional proposed development immediately below of another estimated 13,000 kw. In addition, the carrying capacity of some existing transmission lines will be increased and certain ties or loops made, in order to improve deliveries.—*J. C. Boyle, vice-president and general manager.*



Special cable-laying barge purchased and reconstructed by Puget Sound Power & Light Co. So extensive is company's Puget Sound cable operations that after years of cable laying with various ships and barges this new cableship was permanently acquired

Eugene Water Board

The system peak load of the Eugene Water Board in December 1947 was 29,600 kw. In 1948 it will be well over 34,000, more than double the 1944 peak of 15,000.

On Dec. 1, 1947, the total number of customers was 15,121, an increase of 10% in a single year. Total customers, domestic and commercial, increased 1,800 in 1947.

In 1947 per-residential-customer use of electricity was well over 5,000 kwh. In 1946 the average was 4,582 kwh.; 1945, 3,799, and 1944, 3,424.

Revenue from sale of electricity was in excess of $1,200,000 in 1947. A total over $1,400,000 is expected in 1948.

Outlay for electrical distribution system improvements was $350,000 in 1947. The 1948 budget for this item is $694,000—although some of this construction will extend into 1949.

The increase in customers and per-customer use of electricity has burdened all facilities. The year 1947 saw the launching of a $5,800,000 construction program for new generating and distribution system facilities. It will be well under way in 1948, and all completed by 1951.

The projects, in addition to the $694,000 distribution system program mentioned above, are:

1. Rebuilding and increasing the capacity of the Walterville hydro plant, $2,000,000, to add from 1,000 to 5,000 kw. of capacity, depending on river flow. Water wheel and generator contracts were approved in 1947.

2. Installation of a second generating unit, 7,300-kw. capacity, at Leaburg, to cost $410,000. The power house was previously designed for this second unit. Contracts for the wheel and generator let early in 1947.

3. Installation of a 15,000-kw. steam-electric plant in Eugene, $1,600,000. Plans and specifications are in hands of bidders; bids to be called Feb. 2, 1948.

Net result of the above three projects will be the addition of 16,000 kw. of firm power, or 27,300 kw. total when river level is high. (The season of high river level usually coincides with peak load season.) Present firm power generating capacity of system is 25,000 kw. Thus the new total capacity will range from 41,000 to 52,300 kw., depending on river.

The Eugene system has a firm power contract with Bonneville Power Administration for 5,000 kw.—which will be increased in near future.—*R. B. Boals, superintendent-secretary.*

Mountain States Power

As was the case with the majority of public utility companies in the Pacific Northwest, the year 1947 was a year of intense construction activity for Mountain States Power Co. Although the only generating plant installed comprised two diesel units of 800-kw. capacity each, the year's construction expenditures of approximately $3,000,000 were the greatest in the company's history. Transmission projects included 46 miles of 66-kv. representing three lines in Oregon. None of these was entirely complete by the end of the year but all will be finished in 1948. The majority of construction expenditures during 1947 were for distribution facilities and during the year approximately 9,000 customers were added.

During 1948 it is proposed to construct new 66-kv. substations at Cottage Grove, Springfield, Albany, Otis, and Coos Bay, Ore. The majority of the 1948 construction budget of approximately $2,750,000 covers additions and extensions of the distribution system.—*J. Ford, assistant secretary.*

Pacific Power & Light

Construction expenditures on the Pacific Power & Light Co. system reached a total of approximately $6,300,000 for 1947. This represented an increase of $2,900,000 over 1946 construction requirements and reflected a heavy program to catch up on needed system additions and betterments delayed by shortages of the war years. Preliminary estimates point to a budget for 1948 of approximately the same size.

A 1,000-kw. diesel generating plant was installed at a cost of $200,000 to provide emergency and peaking capacity for the Enterprise hydroelectric system served by the company. An additional $100,000 was spent to complete a $234,000 rebuilding job on the Naches hydro plant, severely damaged by fire.

Substation transformer capacity installed during the year totaled approximately 65,000 kva.

Transmission line constructed during the year reached 42 miles, about 60% of it for operation at 66,000 volts. The major portion of the 66-kv. line is represented in a Troutdale-Portland circuit designed to form a permanent interconnection between the Pacific system and the lines of the Bonneville Power Administration. A 17½-mile, 22,000-volt line was built between Ione and Heppner, Ore., to provide a new source of power supply for the latter city.

Distribution lines added to the system during the year totaled approximately 300 miles, largely rural. Net gain in meters for the year was 7,169.

Peak for the system during 1947 reached 275,800 kw., a gain of 12% over the 1946 high point.

A single side-band carrier-current communication system for power dispatching was installed during the year. It is the first system of this design to be put in operation and serves between Portland and Pasco, Wash. At the latter point messages are automatically switched to a new-type FM carrier current system for communication with power dispatching centers in Spokane.

Two additional FM short-wave service and emergency dispatching systems were installed as part of a program designed eventually to cover the company's far-flung service area with instantaneous communications of this type. One transmitter serves the Walla Walla area and the other covers the major portion of the rich Yakima Valley. The company's first FM station, outgrowth of one of the pioneer uses of radio in utility operation, covers its Portland-Northwestern division area, the territory formerly served by North-

Farm Electrification by States

State	Total Farms Jan. 1, 1945	Number Farms Electrified July 1, 1947	Number Farms Unelectrified July 1, 1947	% Electrified Farms
Arizona	13,143	11,129	2,013	84.6
California	138,917	125,414	13,503	90.4
Colorado	47,618	32,784	14,824	68.8
Idaho	41,498	38,719	2,779	93.2
Montana	37,747	15,644	22,103	41.5
Nevada	3,429	1,882	1,547	54.9
New Mexico	29,695	12,063	17,632	40.6
Oregon	63,125	58,226	4,899	92.2
Utah	26,322	20,965	5,357	79.7
Washington	79,887	75,382	4,505	94.3
Wyoming	13,076	7,190	5,886	55.0
Totals	494,456	399,408	95,048	

western Electric Co. prior to its merger with Pacific on May 31, 1947.

Modernized supervisory control has been installed to govern Portsmouth substation, a 15,000-kva. substation in the important North Portland industrial area. Naches hydro plant near Yakima was converted to semi-automatic control. At the same time, additional equipment for telemetering and tie-line load control is being installed at Lincoln generating station, company power dispatching headquarters in Portland, for use on the new Troutdale tie with Bonneville. Other equipment is on order for transmitting net interchange information to Spokane as part of joint power operations of Pacific and The Washington Water Power Co.

Approximately 28,000 kvar. of capacitors were installed on the Pacific system during 1947. Plans are in the making for use of an additional 10,000 kvar. of capacitors with automatic switching.

Contemplated construction for 1948 calls for a well-balanced program of development throughout the company's system but with no major additions planned. The company's generating capacity is scheduled to remain constant but an additional 65,000 kva. of transformer capacity is planned.

An estimated 60 miles of transmission lines, almost entirely at 66,000 volts, is scheduled for the year. Another 250 miles, mostly rural, will be added to distribution. Load curves predict a 10% increase in the system peak for the year.

A major future undertaking announced by the company calls for the installation of a second 50,000-kw. generator at the company's Ariel hydroelectric development on the Lewis River in southwestern Washington. Delivery of the unit, which will double the peaking capacity of the Ariel plant, is expected late in 1949. Projected cost of the addition is approximately $3,000,000.—*D. R. McClung, general superintendent.*

Portland Dist., Army Engineers

Only project of the Portland district, U. S. Army Engineers embracing power development other than Bonneville Dam, is McNary Dam on the Columbia River near Umatilla, Ore. Initial power house to be constructed at the dam, which is a power and navigation project with fish facilities, will house 14 generating units representing an installed capacity slightly over 1 million kw. for normal operation. Appropriations for fiscal 1948 total $4½ million, for engineering studies, designs, plans, specifications and hydraulic model studies. Delivery of power from first three units by 1953 is present goal of the Corps of Engineers.

Portland General Electric

Our construction expenditures for 1947 are estimated to be about $6,500,000, and although 1948 construction figures have not been established or approved, it is expected that the budget will be for about $7,500,000. The larger part of the 1947 construction expenditures were made on additions to the distribution system including new substation capacity of 60,000 kva. to serve new 12,500-volt and 4,160-volt feeders.

By reason of the system load growth (peak increased 13.6% over 1946) and the fact that the transmission lines of the Northwest Power Pool are so heavily loaded it was necessary and desirable to add about 25,000 kva. of shunt capacitors on the feeders of our distribution system. This brings the total of shunt capacitors to almost 60,000 kva. on the system. The capacitors added in some cases were placed to improve voltage conditions on the feeders, but the larger part of them were located to obtain support for the transmission system voltage.

Because of the extremely heavy load growth in rural areas and the smaller communities, steps were taken to install new substations or substation additions to provide 12,500-volt capacity so that the 2,400-volt feeders could be reduced in size or replaced entirely.

The company's new FM 76-megacycle radio transmitter on Mt. Scott was placed in operation and work is proceeding on installation of FM 2-way sets in new line trucks and district cars. The new FM equipment is being put into operation in locations where the AM equipment does not give good results.

In 1948 the company will add a large amount of distribution substation capacity — approximately 80,000 kva., the greater part of which will step down from 57,000-volt to distribution voltage.

Due to heavy loading on 11,000-volt cables serving the west side of Portland, plans are being worked out to obtain new 11-kv. circuit capacity between the 62,500-kva. tie with BPA at Station E and the Station L steam plant which will reduce loading on the present tie cables and supply a new west side substation, which in turn will pick up load to relieve the transformers and feeders from the existing three west side substations.

Major transmission line additions, principally at 57,000 volts, will be made to provide high-capacity lines to carry the power which will be made available through a new 250,000-kva., 230/57-kv. interconnection with BPA at Troutdale. This program will be started in 1948 and should be completed early in 1949.

One of the major engineering and construction jobs planned for completion in 1948 is to rebuild the Little Sandy flume. This flume is approximately three miles in length and supplies water to Station O at Bull Run. The construction will be made with creosote-treated lumber.—*John Bankus, chief engineer.*

Utah

Telluride Power

Construction of 47 miles of 44-kv. transmission and 20 miles of distribution lines with addition of 300 kw. of transformer capacity accounted for a substantial part of the $300,000 spent in 1947. To accomplish automatic sectionalizing of the line, nine 44-kv. oil circuit breakers were installed.

Addition of 250 meters was accompanied by an increase of 12.3% in peak load, with a further increase of 14.7% expected in 1948. Transformer capacity will be increased by 1,000 kw., and an additional 54 miles of 44-

kv. line and 25 miles of distribution lines will be constructed with the 1948 budget of $250,000. Additional power required will be purchased from a neighboring utility.

Utah Power and Light

It is estimated that $3,825,000 was expended for new and improved facilities for Utah Power & Light during 1947. Our 1948 budget provides for a total expenditure of $5,333,000 for new facilities. System peak for 1947 was up 8.6% over 1946, with 8,000 new meters. Transformer capacity was increased by 52,900 kva., and line construction kept pace with 62 miles of 44-kv. and 335 miles of distribution.

Construction in 1948 will include $600,000 for increased substation transformer capacity, $770,000 for new 44-kv. transmission lines, and $224,000 for distribution lines. An additional $820,000 will be spent for reconstruction of a flume and for 600 ft. of 8 ft. 6 in. dia. wood stave pipe and surge tank.

We anticipate that our 1948 system peak will be 6.5% above 1947. An additional 40,000/44,000-kw. steam-electric unit is planned for our Orem, Utah, plant, to be placed in service about July 1950.—*T. A. Purton, chief engineer.*

Washington

Columbia Basin Project, USBR

Work was in progress on irrigation features of the project, including South Coulee, Potholes, and Long Lake dams and main canals. The Pasco pumping plant transmission line was completed in 1947, and the pumping plant is scheduled for completion in the first part of 1948. Most of the major construction contracts for Grand Coulee pumping plant are expected to be awarded during 1948. One 108,000-kw. generating unit was added to the Grand Coulee power plant during 1947, and two additional similar units are scheduled for completion during 1948.

Puget Sound Power & Light

During 1947 we spent approximately $7,700,000, mostly for high- and low-voltage distribution facilities, and we have a 1948 budget of $8,000,000 for such work. System peak was up 8.8% over 1946, with 13,000 more meters. In the course of the year we completed the construction of approximately 50 miles of transmission line, costing with terminal facilities approximately $1,136,403. Twelve distribution substations, with 58,000-kva. capacity, costing approximately $475,000, started in 1946, were completed in 1947, and 11 distribution substations, with 31,000-kva. capacity, costing approximately $755,000, were constructed and placed in service in 1947, along with approximately 150 miles of distribution lines.

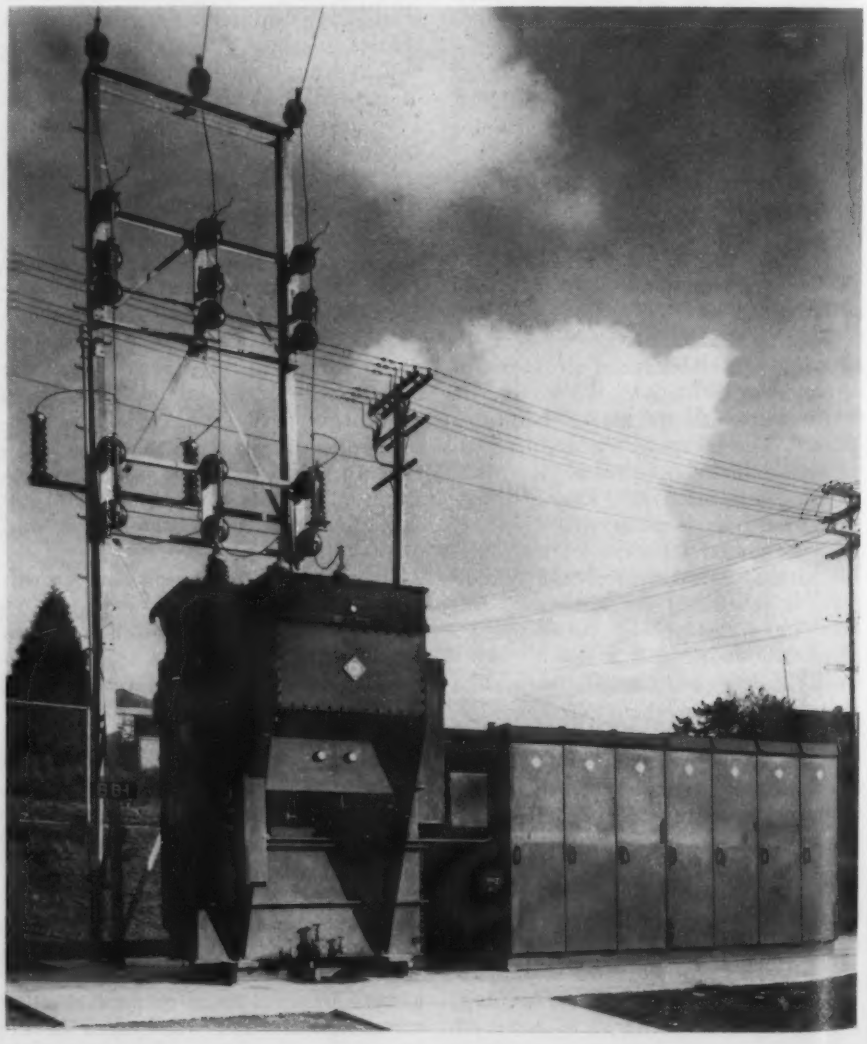
Specific developments of engineering interest included the purchase and reconstruction of a cable-laying barge, installation of one land radio-telephone station with 12 mobile stations, and additional telemetering facilities for metering new points of interconnection; also the installation of 15,000 kva. of capacitors and the conversion of 2,400-volt delta distribution systems to 4,160-volt star operation.

During 1948 when system peak will increase another 14.5%, it is planned to build approximately 53 miles of 33-kv. and 55-kv. high-voltage distribution lines, construct 28 new distribution substations, and to increase the capacity of several others by 144,000 kva. at an over-all cost of approximately $2,435,600. It is further planned to install 30,000 kva. of capacitors at various locations, several delta distribution systems will be converted to star operation, and additional distribution substations will be interconnected. One mile of transmission and 214 miles of distribution lines will be constructed, and we contemplate installation of 20 additional mobile radio-telephone units.—*Frank McLaughlin, president.*

Seattle City Light

Total expenditures on plant improvements amounted to about $7 million in 1947. Approximately $5 million was put into construction of Ross Dam and the balance was spent almost entirely on distribution facilities. Eight miles of 26-kv. line were completed and 17 unit-type substations were placed in service totaling 51,000 kva. Extensions to the primary and secondary distri-

One of 17 unit-type 3,000-kva. distribution substations totaling 51,000 kva., placed in operation by Seattle City Light to meet load growth in 1947



bution system were made. Line transformer supply has been critical with serious overloading being experienced in some districts.

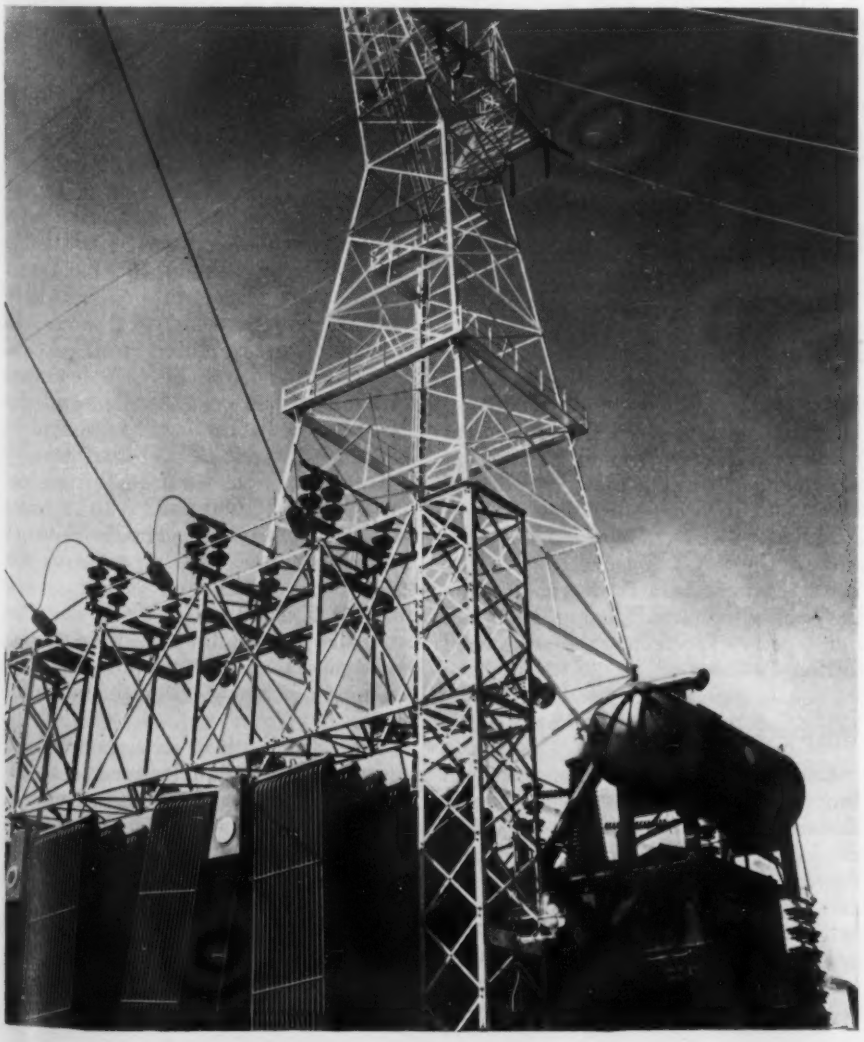
The number of electric meters on the system increased from 118,101 at the end of 1946 to 122,869 at the end of 1947, an increase of 4.04%. The net system energy for 1947 was 9.6% greater than for 1946 and the system peak demand increased from 241,000 kw. to 252,000 kw. or 4.6%. The annual system load factor was 52.5% in 1947 compared with 50% in 1946.

The program for expansion of facilities in 1948 provides for an expenditure of approximately $8.5 million. Of this amount $4 million will be for completion of Ross Dam, $2 million for an additional generating unit at Gorge plant and preliminary engineering on Ross power plant, $150,000 for transmission, $1 million for substations, $1 million for primary and secondary lines and services, $175,000 for 26-kv. lines and some miscellaneous plant items.

Although the system energy increased 9.5% in 1947 over 1946, it is estimated that the increase in 1948 over 1947 will amount to 5%. The peak load for 1948 is estimated at 290,000 kw. The peak load for 1947 (252,000 kw.) was about 18,000 kw. below the anticipated peak. It is believed that this reduction was mainly due to favorable weather conditions during the month of December.

A construction program for Seattle City Light entailing an investment of approximately $50 million is planned during the next eight years. Included in this program is the installation of an additional 60,000-kw. generating unit at the Gorge hydro plant on the Skagit River, considerable expansion of transmission facilities, construction of Ross power plant on the Skagit River with an installation of four 90,000-kw. units, and construction of a dam on the Skagit River at the headworks of the present Gorge plant, increasing the head on that plant by 100 ft. A comparable expansion of distribution facilities will also be included in the program.—*E. R. Hoffman, superintendent of lighting.*

Kidd substation of B. C. Electric Railway Co. serves as both distribution source and terminal for 230-kv. interconnection with Bonneville Power Adm.



Tacoma City Light

Postwar residential, commercial and industrial electrical requirements continued to increase during 1947, all combining to give Tacoma City Light a gross system load of 946,591,000 kwh., an increase of 8.7% over the previous year. The corresponding peak was 186,000 kw., occurring Thursday, Dec. 18 at about 5:30 p.m. Early January 1948 has already experienced an increase over December's peak kilowatts to 189, portending continued increases through 1948.

Tacoma's average residential consumption during 1947 exceeded 5,000 kwh. per billing. This is more than double the corresponding figure for 1941, and about 3½ times the national average for 1947.

During the year the city's transformer substation capacity was increased by 41,890 kva., with 60,000 kva. additional scheduled for installation during 1948. Of these totals, 12,000 and 9,000 are in unit substation installations during 1947 and 1948 respectively.

The light division announced in March 1947 commencement surveys on the Cowlitz River, in the vicinity of Mayfield and Mossy Rock, to determine suitability of sites for the construction of storage and regulating dams. This followed acquisition of water rights under permits issued by the state of Washington on the Cowlitz River in the vicinity named. Determination is being made of the amount of power which can be developed. Gross storage will approximate 1,375,000 acre ft. The city now has its Cushman development of 90,000 kw. on the North Fork of the Skokomish River, two separate and distinct water sheds. The proposed Cowlitz development will provide the city with additional stream flow diversity, and appreciable additional storage.—*J. Frank Ward, superintendent, Light Division.*

Washington Water Power

An all-time high in distribution of electricity and number of customers served was reached in 1947 by the Washington Water Power Co.

A total of 1,859,000,000 kwh. of electricity was used by the company's 102,159 general business customers at the close of a 12-month period ended early in December. This was a 30% increase over last year in kilowatt-hours sold, and a 7% increase in the number of customers.

The WWP generated 1,417,000,000 kwh. in its own hydro plants and obtained the balance from other generating sources in the Northwest Power Pool.

Sale of power to rural customers showed a 25% increase during the year. Commercial usage increased 21%; residential, 20%, and industrial 18%.

The wartime peak of 435,817,011 kwh. used by industrial customers of the company during the first eleven months of 1942 was exceeded by 8% in 1947 with WWP furnishing 471,984,128 kwh. to new and expanding industries in a corresponding period this year.

Close coordination and cooperation of all members of the Northwest Power Pool was credited for making possible meeting the increased demand for power by all classes of customers throughout the Northwest.

The combined generating facilities of eleven private, municipal and federal agencies make up the pool. About 150 hydro and steam generating plants are interconnected in its operation.

An all-time record was established in Spokane alone on Dec. 10 when during the peak hour from 5 to 6 p.m. the company met a demand of more than 100,000 kw. by all users. In December 1946 the peak in Spokane was 89,000 kw.

Annual average use of electricity by residential customers was 4,153 kwh., increasing to that amount from 3,651 in 1946. Increased use decreased the average residential rate from 1.41 cents per kilowatt-hour in 1946 to 1.35 cents in 1947.

Operations in 1947 were highlighted by the extensive construction program to increase capacity of the company's system in Washington and Idaho to meet the rising demand for electric service. More than $3,225,000 was spent in construction of new facilities and the rebuilding and expanding of others.

Largest single item was $825,000 for new lines and extensions, which included the addition of 255 miles of new farm line, notably in the Carlin bay area of Coeur d'Alene Lake, and other remote areas in Idaho. A 42-mile long transmission line into the rugged Pierce-Headquarters area was energized in February.

The company added the three communities of Harrison, Pierce and Elk River, Idaho, to those served directly. Following purchase of the three systems, 25-year franchises were granted the WWP.

A 15-year non-exclusive franchise was approved by Spokane voters in July.

More than $425,000 was expended in the building of new substations of the company, and increasing the capacity of others. One hundred fifty thousand dollars was used to rebuild distribution systems. Major cut overs to higher voltage to accommodate the sharply increased load was accomplished in Moscow, Colfax, Lewiston, Harrington and parts of Coeur d'Alene and Spokane.

Another large item was $750,000 for new transformers and meters.

Reinsulation and rebuilding of transmission lines to carry higher voltage into the Colville Valley, the Lewiston-Craigmont area, and from Post Falls to Newport, required an additional $275,000.

Additional connection points for the delivery of Grand Coulee power to REAs by the WWP were made during the year.

Another $250,000 was used to purchase and install capacitors, special equipment capable of improving technical voltage conditions.

Some materials, notably power transformers, insulators and some street lighting equipment were still difficult to obtain, with delay in receipt of material ordered many months in advance of anticipated need being encountered throughout the year, retarding full progress of construction plans. Construction costs for 1948 are estimated to be just under $4,000,000.—*J. E. E. Royer, vice-president and general manager.*

Wyoming

Shoshone Project, USBR

Construction was advanced on the Heart Mountain power plant during 1947 and the structure is nearing completion. Major equipment installation is scheduled during the first part of 1948, and it is expected that all construction will be completed before the end of the year. Construction of the Heart Mountain-Garland transmission line was also started during 1947 and the line is expected to be completed during 1948.

Missouri Basin Project, USBR

Construction of five dams was in progress. These are Kortes, Angostura, Enders, Heart Butte and Boysen. The diversion tunnel at Kortes was holed through in the latter part of the year, and at Angostura preparations were being made for diversion of the river to permit excavation in the river channel section. Construction work for Boysen Dam and power plant included excavation on tunnel, diversion channel, spillway and outlet works. Construction of the Canyon Ferry Dam and power plant is expected to start during 1948. Construction of irrigation features on the project is expected to be considerably advanced during 1948 with the start of construction on a number of pumping units and canals. Additional construction on project transmission lines and substations is also scheduled for the coming year.

Hawaii

Hawaiian Electric

Hawaiian Electric spent $5,500,000 for new and improved facilities during 1947, and has budgeted $3,300,000 for 1948. Culminating a $7 million project started in 1945, Waiau Unit No. 3, a 40,000 kw., 3,600 r.p.m. Westinghouse unit went on the line in December. The project included a 42,000-kva. 11/44-kv. transformer bank to connect the generator to the 44-kv. switching station, two oil tanks of 80,000 and 30,000 bbl., and erection of a warehouse.

Honolulu's underground distribution system was converted from 2,400 volts to 4,160 volts, increasing its capacity without adding circuits and making possible emergency ties to other stations that were supplying 4,160 volts. The Iwilei industrial district 2,400-volt overhead distribution system was also converted to 4,160 volts, eliminating the last of the 2,400-volt distribution except for a few very minor installations in rural areas. In residential areas, three 1,500/1,875-kva., 11,000/4,160-volt, single-circuit unit substations were installed and one 1,500-kva. substation was increased to 3,000 kva. to take care of load growth.

Total additions to transformer capacity were 76,900 kva. with 3 miles of 11-kv. transmission and 34 miles of distribution lines helping to serve the 6,430 new customers. System peak reached 104,000 kw., a 2.6% decrease from the peak of January 1946, which still included some abnormal war loads. An increase of 8% is anticipated for 1948.

The distribution department had eight 2-way radio-telephone sets installed in trouble cars. The service is supplied by the local telephone company which owns and maintains the equipment and operates the central transmitting and receiving station.

It is planned in 1948 to install automatic transfer equipment on incoming 11-kv. circuits at all major distribution substations of 3,000 kva. to 6,000

kva. in the city to provide a preferred and emergency supply. Nine miles of 44-kv. transmission line is planned, and an underground low-voltage network system will be started in 1948 in the heavily loaded business district by installation of six 500-kva. network transformers with three 11,000-volt circuits from Honolulu generating station. Total increase in transformer capacity will be 22,000 kva., in transmission lines 15 miles, and in distribution 35 miles. Delivery of a 40,000-kw. unit duplicating unit 3 mentioned above is scheduled for 1949.—*L. A. Buese, vice-president and executive engineer.*

Canada

B. C. Electric

Total expenditures of British Columbia Electric Railway, which were approximately $8,500,000 during 1947, will be nearly doubled to $15,000,000 for 1948. System peak reached 219,000 kw., an increase of 7.4% over 1946, with addition of 14,742 meters.

Murrin substation, located in the downtown Vancouver area, was officially opened Nov. 24, 1947. This indoor-type station accommodates three 25,000-kva., three-phase transformers, stepping down from sub-transmission voltage (34 kv., ultimately 60 kv.) to 12 and 4 kv., with high- and low-voltage switching and controls. Load is being transferred to this station from two existing stations, which it will replace in 1948.

A 230-kv. interconnection with the Bonneville Power Administration was completed and went into service in August 1947. Twenty-five miles of this circuit is on the Canadian side of the international boundary. Woodpole H-frame construction is utilized. Kidd substation, located on the north arm of the Fraser River, serves as both distribution source and terminal station for the BPA Interconnection. One three-phase transformer, 33,333-kva. forced-air-cooled rating, was installed in July 1947, connecting the 230-kv. tie with the sub-transmission system. Installation of a second similar unit will be completed early in 1948. A 15,000-kva., three-phase, three-winding transformer at this station serves distribution load at 12 and 4 kv., to be followed by a second unit in 1948.

As part of a sub-transmission ring to encircle the metropolitan area, a 4.3-mile route section of 69-kv. underground cable was installed in 1947 between the new Murrin substation and existing Point Grey substation. This circuit is comprised of three single-conductor cables of oil-filled type.

Crews are kept busy in reconstructing lines of Washington Water Power Co.

Combined with the new system load dispatch office, a control center has been set up which will supervise by remote control the functioning of both Murrin and Kidd substations, and various other stations in the metropolitan area.

Equipment was delivered in 1947 for a radio communication system, using frequencies in the 150-megacycle band, which system is now being installed to improve system operations. This comprises equipment to reach power plants and other fixed points on one channel, cars and mobile trucks on another channel. Equipment will also be provided for remote indication from two rural substations over one of these channels.

Planned for 1948 and the Future

A major operation for completion in 1948 is the initial unit of the Bridge River plant, comprising a 62,000-hp. unit, operating under a head of 1,160 ft. This will be followed by a second similar unit in 1949. A third unit is projected for the late autumn of 1949. The transmission line to bring power from this source to the Vancouver area will be mounted on steel towers throughout its 130-mile length. Construction of the line is well advanced and will be completed this autumn. Work is proceeding on a rock-fill dam in the Bridge River to divert the water through the existing 13,200-ft. tunnel to the Seton Lake side of Mission Mountain, where it will enter the penstocks leading to the power plant on the lake shore. Work has also been progressing since June 1947, on a storage dam in the vicinity of La Joie Falls, on the upper reaches of Bridge River, to provide necessary storage facilities.

Another major project, the initial stages of which will be completed this autumn, is the enlargement and reconstruction of Horne Payne substation to receive Bridge River power and transform it to sub-transmission ring voltage. This station will also serve as a major distribution point for the load in the vicinity, both in Vancouver and in Burnaby Municipality. In order to enable the transmission line to carry the output of three Bridge River units a 30,000-kva. synchronous condenser is planned for installation at this station in 1949. In the western portion of Vancouver another major ring station is planned for construction in 1949, to supersede the existing Point Grey substation. Reconstruction of the present Burnaby substation will follow.

During 1948 additional 69-kv. underground cable will be installed, comprising two complete circuits between Horne Payne and Murrin substations, forming another section of the sub-transmission ring previously referred to. Various additions will also be made to the aerial portions of this ring.

In the section of the Fraser Valley which is served by this company, extending from Vancouver eastward to some miles beyond Chilliwack, a change-over is now in progress from a 2.3- and 12-kv. installation to a 6.9/12-kv. system, with common primary and secondary neutral. One existing station serves this system and three 3,000-kva. stations will go into service in 1948. Two further stations, one double the above capacity, are planned for 1949. Reconstruction and extension of the transmission system to serve these stations will be undertaken this year and continued into 1949.

In the Vancouver City area considerable rehabilitation of transportation power facilities is also planned; this involves replacement by rectifiers of present manually operated rotating equipment in two substations and construction of one entirely new station, a total of 10,500 kw. of rectifier plant in the three stations. The company's initial trolley-bus route is scheduled to go into operation early this year and will be followed by others in a gradual program of conversion from street railway operation.—*T. Ingledow, vice-president and chief engineer.*

Electrical expositions came back to bigger than ever crowds. The San Diego revival was packed like this

1947—THIS ELECTRICAL BUSINESS—1948

BUSINESS used to be a by-guess and by-gosh proposition. If it came out profitably that was good; if it didn't it went broke. It was strictly sink or swim, with very few landmarks to swim toward. But in those rough, raw days, while the risks were big, the profits could be tremendous. As business began to be hedged in with restraints and restrictions, and profits trimmed by public pressure and by competition, it became more of a science to run a business in a way to come out with a profit. Business needed steam gages, pressure gages, compasses and charts. By-guess had to give way to estimates and budgets, based on as accurate information as possible. Figures began to be important—all kinds of figures, facts, trends, percentages. They are the instruments by which business is navigated. And that is why this February issue each year is devoted to the best available figures about the electrical business in the eleven Western states.

There is meaning in these figures. To be sure, a man's own business figures come first. Then such figures as contained in these pages give him perspective for they tell him the depth of his market area, his relation to it in number of competitors, customers, quotas estimated by the utility serving those customers, what assistance will be given to the development of that market by utility, league or association promotional effort. Last year's figures give an idea of what the business was good for then and how saturated the market is. Keen merchandisers will read into these facts and figures the important trends they represent—such as when to expect the trade-in to become important, how much replacement to new sales.

To manufacturers these figures should be valuable in readjusting allocations and improving deliveries to Western distributors and dealers, as well as setting quotas and discovering market potentials.

Utility people have always been keenly interested in these figures be-

cause they give them a gage of their own programs as against those of other utilities, tell them of other activities they may assist with and note trends in cooperative programs, sales activities, types of load or appliances to promote or pioneer. A brief summary of commercial cooking, lighting, wiring, agricultural and industrial development activities is also afforded them in these pages.

As much as possible has been condensed into the tables on these pages. The comment or reasoning or the explanation of the figures, etc. is treated by subjects rather than companies or utilities.

Some broad aspects regarding the entire West are significant. The figures in the January statistical and market planning issue of *Electrical Merchandising* should be studied for national production and shipment totals, by states and regions, and the state saturations based on these national figures. Then the individual company figures should be studied to relate them to the actual territory served. Bulking the figures by states, in this West of great open spaces, does not give true pictures of the worth of individual areas. For company or individual utility figures those in ELECTRICAL WEST are brought up to date for the year in many instances. The *Electrical Merchandising* questionnaire required answers in October and thus the last three months were estimated. In two notable instances the figures are very different. In November Canada put on severe import restrictions which cut year end totals for B. C. Electric Railway Co. On the other hand San Diego Gas & Electric, because of its pre-Christmas electrical show, raised sales figures higher than October estimates. Some additional districts were also heard from, notably Sacramento Municipal Utility District, with its 35,800 domestic and 21,880 rural customers, which the year previous had been Pacific Gas and Electric Co.

Total refrigerator sales in the eleven Western states exceeded 200,000 units and in 1948 a conservative estimate would be 225,000; ranges numbered more than 100,000 in 1947 and should top 150,000 in 1948 if available; water heaters are really coming into their own, with 87,000 reported sales and an easy 90,000 to 100,000 in 1948. Southern California Edison Co., in announcing an advertising campaign on water heaters in 175 newspapers to assist dealers make sales, gave these startling figures, "More than 125,000 water heaters of all types were sold to Edison customers in 1947, 60,000 of them went into new buildings." These figures include gas and butane water heaters, of course, but also give an indication of the potential market and demand.

What each kilowatt of new generating capacity can mean to the sales branches of the electrical business was dramatized into a compact and easily appreciated picture by Charles A. Dostal, vice-president of Westinghouse Electric Corp., San Francisco, when he told an audience of wholesalers the size of their sales opportunity.

If the Pacific Coast utilities increase generating capacity by 50,000 kw. in 1948, and 20% of it is for new residential load, and if the average peak demand per residential customer is 500 watts, it means two new houses served per kilowatt. Wiring for each house, he estimated, would come to $300, of which $120 would go for wire and devices, $40 for fixtures, or $160 per house.

Each house at least would have a washer, refrigerator, toaster, percolator, vacuum cleaner, two clocks, an iron, an auxiliary air heater, a floor lamp, 1½ radios, 30 lamp bulbs. Just the total of these appliances at list would be $710; add the $160 for wiring supplies, and each house represents $870 to the electrical business. Dostal applied these figures to the 100,000 kw. of domestic allocated new generating capacity and said a market of $174,000,000 was represented in it.

By applying this base figure to the new residential building in any community, or by applying it to the generating capacity that the local utility is planning to install in 1948, can give an individual market potential figure worth considering.

All factors point to 1948 as another big year. All records tell that 1947 was the biggest year so far in the electrical industry. And all indications point to the West as the region of fastest growth — in population, in industries, in business, and in electrical living.

Appliance Promotions

For easier reference and cross-comparison, as much as possible of the appliance information derived from the questionnaires has been concentrated in the tables on these pages. They give the figures and essential facts in a nutshell.

In certain cases some additional comment is necessary for clarification or to give some background for the figures. Likewise many of those answering gave important factors affecting the past year's sales performance and other situations facing the electrical business in the area served as seen at the beginning of 1948.

The basic questionnaire from which the figures used in *Electrical Merchandising* were derived was sent out exceptionally early last year and as a result the last two or three months operations had to be estimated in the answers given. ELECTRICAL WEST followed this original questionnaire with a brief one of its own asking for revised figures for the year and in many cases there was some slight change. Some significant changes may also be noted, particularly in the case of British Columbia, where the austerity program of Canada put a bar to the importation of American-made appliances in the fall of the year and ran the totals for the year into somewhat of a decline. On the other hand, quotas or estimates made in October for *Electrical Merchandising* were exceeded in other areas of the West, particularly in San Diego.

For a more intimate understanding of the meaning of the figures in the tables on these pages, additional comments from answers to the questionnaires are to be found in the following quotations or summaries:

Arizona Edison Co., Prescott, according to D. B. McGregor, vice-president, reports market conditions good in the territory with all estimates made prior to the war's end exceeded. The territory depends on mining, agriculture, and tourist trade for its business. Doing no merchandising, the company will promote ranges, water heaters, home freezers and roasters. Consumer resistance is noticeable at present price levels. The company is considering a subsidy on range wiring.

Burbank Public Service Department, according to Joseph W. Fitzpatrick, new business agent, also reports consumer resistance to present appliance prices. It will promote ranges, water heaters; it does no merchandising itself. Business conditions are good and estimates are standing up to previous hopes.

British Columbia Electric Railway Co. found business booming in appliances up to November. Hence the reports for *Electrical Merchandising*, in which estimates were made for the last three months, reflected that optimism. However, the Canadian government, facing an unbalanced exchange situation with the United States, took drastic measures to restrict importations. This put a blight on selling by dealers during the last three months of the year.

According to J. H. Taylor, customer services manager, "there are certain reservations in connection with the figures we have given. In all cases we have had to estimate the December figures as they will not be available until late in January. You will notice

the considerable variation from the figures given in the previous questionnaire sent to *Electrical Merchandising*. This is accounted for by changed conditions in the appliance trade due to government restrictions on appliance imports from the United States, effective November 18, and due to the problematical production in Canada that is dependent to a certain extent on imported sheet steel for enameling (particularly ranges and refrigerators).

"The over-all picture for 1948 would indicate a considerable load growth, although we are not planning any large-scale promotion for immediate load increases due to our power situation. A long-range viewpoint on planned lighting, adequate wiring, kitchen planning, etc. will be carried on as these do not result in immediate load growth."

Up to that time market conditions had been good. Employment had been high. The cost of living, however, was leaving less money for other purchases. One of the principal local factors affecting sales was the high cost of wiring for ranges and water heaters. However there were not enough ranges and a local industry-wide committee was studying the situation. Deliveries except on water heaters, radios and vacuum cleaners, still remained slow.

On the Victoria properties no revision of the previous estimated appliance figures was made. Demand exceeded supply, especially of ranges, refrigerators and washers.

California Electric Power Co., a merchandising utility, had this to say about its policy. "Dealer cooperation, as in the past, will mean good clean active competition in keeping dealers competitive as far as terms and wiring allowances are concerned." J. G. Neal, merchandise manager, felt the situation with dealers was not good due to lack of merchandise. Market conditions were good, but a lack of equitable allocation of merchandise by West Coast suppliers, it was felt, was the principal factor affecting sales. Consumer resistance to prices was reported, especially to range wiring costs, and the company was trying to secure permission to reduce rigid conduit requirements and install an adequate service entrance equipment at the time of the original connection to a house. No promotions were planned as the supply situation was too uncertain. The figures reported are the company's own sales as it does not receive dealer reports. 1948 estimates were based on availability of merchandise.

California Oregon Power Co. no longer merchandises, according to D. A. Runyard, sales manager, who reports market conditions in the territory fair, with lumber and farm prices being good. Consumer resistance to prices were reported, and deliveries not yet normal. Some promotion will be made of ranges and water heaters.

California Pacific Utilities Co. does not merchandise but the program is subject to changes if conditions require, says E. A. Nickelsen, commercial manager. He declared, however, that the growth conditions are exceedingly good at the present time.

"As you will note in the following, the increase in use of electric service and the growth in population of the West Coast area is not limited to the large population centers, but extends also to the rural communities such as those served by our company.

Total Number of Electric Customers—all classes 1947

Year ending	No. of Customers	Increase Number	Increase Percent
Dec. 31, 1947	20,334		
Dec. 31, 1946	18,889	1,445	7.65

Annual Use of Electricity per residence customer

As of year ending	Annual kwh. per customer	1947 Increase Annual kwh.	1947 Increase Percent
Dec. 31, 1947	2,120		
Dec. 31, 1946	1,748	372	21.3

1947 Dealer Major Electrical Appliance Sales to Domestic Customers (urban and rural)

Appliance	No. of units	Domestic customers	No. of customers	Sales units per 100 customers
Refrigerator	1,374	Rural	1,813	
Range	1,167	Urban	14,836	
Water Heater	1,838			
Total	4,379		16,649	26.3

"During the past year we completed a survey of major appliances in use by domestic customers which gave us more accurate figures on over-all saturation. We find some districts with a saturation of as high as 45% on electric ranges and 30% on automatic electric water heaters with over-all company figures of 36% and 24% respectively for these appliances. Our survey also disclosed that approximately 15% of the domestic customers not using either of these appliances volunteer the information that they plan on purchasing them as soon as they can secure delivery. Electric water heaters were generally available for immediate delivery by the dealers in all districts. This partially accounts for the fact that 42% of the sales were automatic electric water heaters. Increasing cost of competitive fuels will undoubtedly maintain the demand for this appliance. When a greater number of ranges and refrigerators are made available to dealers in the rural communities, we may also expect an increase in the sale of these appliances with the increasing cost of other fuels."

Central Arizona Light & Power Co., according to A. W. Smith, manager, general residential and small commercial sales, anticipates beginning a dealer cooperative sales program shortly. At present however, exact records of appliance sales are non-existent. It is known that business conditions have been excellent and that estimates made at the close of the war are exceeded. The residential building is booming. Consumer resistance to appliance prices is slight. Appliance deliveries are evidently based on prewar population and do not take into account the great increase since the war. Promotions will be planned soon on ranges, water heaters and in a limited way on home freezers, refrigerators, coolers, lighting.

Cheyenne Light Fuel & Power Co. continues to merchandise direct, has no figures on sales for the territory outside its own, finds market conditions good, deliveries below normal. It reports friction between plumbers and electrical dealers over the sale and connection of water heaters, and reports consumer resistance to prices. Promotions will be made on ranges, water heaters, freezers and blankets, according to C. J. Hughes, commercial manager.

Colorado Springs Department of Public Utilities, according to F. G. Armbruster, new business agent, does not merchandise so figures on appliance sales are not available through the department.

Coast Counties Gas & Electric Co. merchandises ranges, water heaters, refrigerators, freezers and air heaters, finds the deliveries of appliances below normal and on an allocation basis. It reports shortages of ranges and refrigerators, with some slight resistance to prices. It will have promotions on electric water heaters and air heating, according to Al Wollenberger, regional sales manager. Business conditions are good and are due to increased population. 1948 estimates on refrigerators, ranges, automatic washers, ironers etc. depend upon the supply and could readily be tripled if appliances are available.

El Paso Electric Co. likewise continues in merchandising with a complete line. It reports that old reliable dealers are in strong position, but the new ones are weak. Business conditions are good according to H. A. Walsh, new business manager. New residences and high employment contribute to this condition. Deliveries are not yet normal and consumer resistance to prices is noticed. Promotions will be had on ranges, water heaters, home freezers.

Ely Light & Power Co. (Nevada) does not merchandise except for lamps, according to T. A. Smith, president. Market conditions are good, rates however militate against water heaters. The need for heat for nine months restricts sales of electric stoves unless

Customers and Consumption

UTILITY TERRITORY	Average Annual kwh. consumption—Residential—					Customers—Residential Customers		Farm Customers		Commercial Customers		Total All Customers	
	1947	1946	1945	1944	1943	1947	1946	1947	1946	1947	1946	1947	1946
Aberdeen, PUD No. 1	2,593	1,800	....	....	....	9,778	9,564	2,320	2,109	2,289	2,146	14,618	14,034
Alameda P.U. Dept.	2,625	1,480	1,416	1,344	1,256	12,560	12,421	....	....	....	....	....	....
Anaheim L. & W. Dept.	1,000	....	750	700	....	3,879	3,677	....	....	1,000	947	....	....
Arizona Edison	....	1,100	....	....	....	14,700	14,412	....	150	....	....	....	....
B.C. Electric Ry., Vancouver	1,450	1,318	1,089	1,089	1,025	100,000	96,004	30,000	25,946	20,200	18,601	153,500	143,667
B.C. Electric Ry., Victoria	1,425	1,336	1,218	1,062	952	23,844	21,403	6,153	5,771	4,242	3,897	34,239	31,071
Burbank P. S. Dept.	1,550	....	....	....	....	21,500	19,750	....	....	....	....	....	....
Calif. Elec. Power	1,450	1,476	....	1,300	1,259	31,800	27,000	10,000	8,216	6,700	5,800	48,500	41,116
Calif. Oregon Power	3,590	3,228	2,886	3,024	2,909	46,000†	41,176†	....	414	....	9,386	....	....
Calif. Pacific Utilities	2,120	....	1,664	1,494	1,413	14,836	13,619	1,813	1,581	3,750	3,493	20,334	18,889
Central Ariz. L. & P.	1,689	1,569	1,452	1,324	1,070	45,831†	40,527†	....	....	7,975*	6,699*	54,560	47,866
Cheyenne L. Fuel & P.	1,500	1,400	....	....	....	7,265	7,150	265	240	....	....	....	....
Coast Counties G. & E.	1,450	1,250	....	943	871	15,824	14,299	12,538	12,034	5,280	4,769	35,713	32,986
Colorado Springs P.U. Dept.	1,325	1,092	1,190	1,142	1,002	15,500	14,806†	....	....	....	....	....	....
El Paso Elec.	1,610	1,557	1,445	....	1,315	34,731	32,310	2,693	2,328	....	5,567	....	....
Ely L. & P.	892	....	....	....	....	1,260	1,239	1	1	....	....	....	....
Eugene Water Board	5,000	4,400	3,800	3,424	3,269	9,100	7,810	3,900	3,346	1,900	1,620	....	....
Frontier Power	896	761	....	....	661	5,801	5,572	880	814	1,148	1,088	8,556	8,082
Glendale P.S. Dept.	1,600	1,400	1,320	1,291	1,162	29,000	28,081	....	....	6,000*	....	35,000	....
Hawaiian Elec.	2,125	1,932	1,791	1,647	1,567	52,581	48,958	....	....	12,125*	12,058‡	....	....
Heber L. & P.	1,600	....	....	....	....	1,400†	1,340†	....	....	....	....	....	....
Idaho Falls Elec. Light	5,600	....	....	....	....	4,500†	4,100†	....	....	....	....	....	....
Idaho Power	3,400	2,900	2,550	2,457	2,361	57,900	52,952	24,700	23,034	12,700*	11,699*	96,450	88,551
Imperial Irrig. Dist.	2,400	....	....	2,078	2,078	9,814	8,684	5,025	4,844	3,516	3,028	22,770	20,453
Logan, City of	....	....	2,334	2,258	....	....	....	....	....	....	....	....	....
Los Angeles Dept. W. & P.	1,470	1,375	1,220	1,135	1,023	497,000	479,032	....	....	80,447	75,836	577,447	554,868
Modesto Irrig. Dist.	2,500	....	2,250	2,148	2,000	5,300	5,088	9,000	7,449	....	....	....	....
Montana Power	1,469	1,325	1,165	1,117	1,081	78,461	74,567	10,764	9,350	13,982	13,336	105,113	98,950
Mountain States Power	2,700	2,100	1,875	1,763	1,684	62,900	56,481	12,500	11,480	10,900	10,077	90,500	82,309
Northwestern Elec.	‡	3,800	3,210	2,950	2,734	.... ‡	41,500‡**	....	....	....	....	....	....
Pacific G. & E.	1,607	1,495	1,345	1,227	1,137	688,000	652,745	205,000	183,663	194,500*‡	184,024*	1,136,000	1,062,723
Pacific P. & L.	3,700	2,673	2,150	1,978	1,895	101,844‡	99,322‡	18,516‡	18,749‡	20,560‡	21,283‡	142,856‡	141,599‡
Pasadena L. & P. Dept.	1,515	1,380	1,280	1,241	1,080	30,184	29,414	....	....	....	....	....	....
Portland Gen. Elec.	3,800	3,197	2,633	2,373	2,218	94,800	91,149	62,000	57,333	180,000*	16,663*	176,500	166,642
Provo P.U. Dept.	1,712	2,412	....	1,368	1,314	7,194	6,412	....	....	891	646	8,085	7,197
P. S. of Colo.	1,219	1,087	975	906	857	133,500	125,807	8,800	7,568	22,100	20,854	171,860	161,259
P. S. of N.M. (Albuquerque)	1,000	900	....	....	....	23,449	20,809	....	....	....	....	....	....
P. S. of N.M. (Deming)	968	885	....	....	....	1,208†	1,109†	....	....	596	551	1,804	1,660
P. S. of N.M. (Las Vegas)	908	830	....	....	....	2,400†	2,182	....	....	590	549	2,990	2,731
P. S. of N.M. (Santa Fe)	780	880	....	....	....	5,500	5,000	400	350	....	....	....	....
Puget Sound P. & L.	5,150	2,660	2,685	2,389	2,262	242,000	231,174	....	....	29,700	28,381	273,000	260,578
Raton Public Service	....	....	1,038	....	....	....	....	....	....	....	....	....	....
Riverside L. Dept.	1,416	1,800	1,260	1,200	....	12,800	11,904	....	....	....	....	....	....
Sacramento Mun. Util. Dist.	1,838	....	....	....	....	35,865	34,151	21,884	18,929	13,204	12,163	70,953	65,219
Salt River Valley Water Users	2,900	2,200	....	....	....	14,513†	13,349†	....	....	....	....	15,250	14,015
San Diego G. & E.	1,540	1,430	1,320	1,246	1,135	97,352	93,193	25,352	21,741	21,117	19,783	150,883	149,991
Seattle City Light	4,525	4,099	3,556	3,246	2,993	94,500	91,120	....	....	15,014	14,284	109,514	105,304
Sheridan County Elec.	1,055	960	851	824	803	625†	554†	....	1,000	....	....	....	....
Sierra Pacific Power	2,800	2,520	2,257	2,066	1,856	18,300†	16,841†	....	....	3,400	2,932	22,000	19,883
So. Calif. Edison	1,400	....	1,216	1,146	1,070	595,241	542,411	26,301	26,096	110,172	96,830	775,000	696,335
So. Colorado Power	1,409	1,300	1,148	1,124	1,047	23,908	23,296	2,595	2,227	3,499	3,307	32,661	31,372
So. Nevada Power	6,800	5,816	4,580	4,534	....	6,700	6,171	....	....	....	1,847	....	....
Tacoma City Light	5,100	4,500	4,178	3,640	3,402	42,400	40,781	....	....	5,015	4,637	48,600	46,571
Telluride Power	1,000	850	850	800	800	5,900	5,770	1,050	980	750	736	7,700	7,436
Tucson G.E.L. & P.	1,560	1,431	1,275	1,711	1,137	11,100	10,495	13,100	10,230	4,620	3,875	28,820	24,600
Uintah Power	....	729	925	875	752	....	900	....	....	....	....	....	....
Utah P. & L.	1,996	1,770†	1,559	1,386	1,328	133,690†	127,526†	....	....	14,645	13,724	150,979	143,692
Vallejo E.L. & P.	1,288	1,248	....	....	1,048	11,780	11,757	....	....	....	....	....	....
Washington Water Power	4,201	3,767	3,168	2,661	2,708	72,101	68,594	14,813	13,073	11,860	11,301	102,284	96,614
Western P. S. Co.	1,300	....	....	....	....	3,490	3,262	20	16	593	576	4,135	3,888

* Includes industrial customers. † Includes farm customers. ‡ See accompanying report for explanation and interpretation. ** Excludes Cowlitz County property sold to PUD. †† Agricultural power only.

the houses are equipped with furnaces.

Eugene Water Board, according to Harold H. King, assistant secretary, says Eugene is probably oversupplied with dealers to serve the number of customers in the territory. The present rapid growth and increased use per customer makes the present power supply inadequate until new sources can be developed, he declares. The average domestic use in 1945 was 3,800 kwh. per year. In 1946 it was 4,582 kwh., and in 1947 it is estimated at 5,000 kwh. An average of 150 new customers were added per month since Jan. 1, 1947. Eugene is the center of a new lumbering boom in the state of Oregon and is straining to meet the needs of all the new people coming into the territory.

Frontier Power Co. of Trinidad, Colo., has just lost to a municipal ownership election and hence its future plans are very indefinite, according to Paul M. Brown, electrical superintendent.

Glendale Public Service Department is not at present merchandising, according to George D. Hastings, commercial agent, but does not know what its future program will be. It will promote electric ranges and water heaters.

Hawaiian Electric Co. notes consumer resistance to appliance prices and declares appliance deliveries far from normal. It is studying the range wiring cost situation which interferes with selling. It is developing its dealer program through the Electrical Development Advisory Service for distributors, dealers and contractors. Market conditions are good.

Heber Light & Power Plant, according to L. A. Wooton, general manager, generates and sells electric power only. It does not enter the merchandising business of appliances in any way. Price resistance is evident, it reports.

Idaho Falls Electric Light Department has an exceedingly high annual kilowatt-hour consumption per residence customer (5,600) because of flat rate water heating. With apartment figures not included the figure would be 5,800. It does no merchandising, but has a dealer cooperative program. Business conditions have been very good, according to M. P. Goudy, superintendent. General crop and farm prices have been good. The economy is based entirely on agriculture. Price resistance has been somewhat evident and there is noted some friction between plumbers and electrical dealers on water heater connections.

Idaho Power Co. merchandises major appliances in areas where sales effort is needed. These are chiefly rural

areas not served by dealers as very little effort is made in the cities served by dealers. The dealer situation is said to be very satisfactory by E. A. Olsen, sales manager. There is no dealer organization as yet. Market conditions have been good, but outside selling is not up to prewar levels. Appliance deliveries are normal on some items, but not on others. Major promotions planned are to be on ranges, water heaters, freezers, blankets, sun and heat lamps, home air conditioning, and foot warmers.

Imperial Irrigation District does no merchandising, according to T. T. Parker, commercial power superintendent. Business conditions are good. Consumer resistance to appliances is evident. The dealer situation is fair.

Los Angeles Department of Water & Power will carry on demonstrations in dealer stores, make distribution of prospects it receives, and conduct dealer salesmen training and dealer repair service training in conjunction with the Southern California Radio & Electric Appliance Assn. Business conditions are very good, but there is still a lack of sufficient appliances. There has not been friction between plumbers and electrical dealers over water heaters, but they are keenly comptitive for any possible craft advantage, according to Charles C. Snyder, business agent of the power system. The major promotions during the year will be on water heaters and adequate wiring.

Logan City Municipal Light Plant does not merchandise and because it has no dealer cooperation has no figures on sales.

Modesto Irrigation District says the dealer situation is fair. It does no merchandising, according to J. M. Grigsby, electrical engineer.

Montana Power Co., according to D. J. McGonigle, general sales manager, would have a good dealer situation if appliances were available in sufficient quantity. Montana, he feels, has suffered in postwar allocations. Consumer resistance to prices will develop during 1948, he thinks. Promotions during the year will be on ranges, water heaters, and dealer sales training.

Mountain States Power Co. has not merchandised appliances for several years and has no program now. It likewise has no information available on dealer sales. Business conditions are good. The dealer situation appears satisfactory. In its Oregon territory the logging and lumbering business is excellent. In the Wyoming territory the oil business is likewise good. Appliance deliveries seem to have been good

Appliance 1947 Sales and 1948 Quotas

	REFRIGERATORS				RANGES				WATER HEATERS				WASHERS—Conventional				WASHERS—Automatic			
	1947 Sales	1948 Quotas	% Repl.	% Sat.	1947 Sales	1948 Quotas	% Repl.	% Sat.	1947 Sales	1948 Quotas	% Repl.	% Sat.	1947 Sales	1948 Quotas	% Repl.	% Sat.	1947 Sales	1948 Quotas	% Repl.	% Sat.
B. C. Elec. Ry., Vancouver	5,500	5,000	5.0	25.6	2,100	3,000	...	15.4	1,250	1,800	...	4.6	8,500	8,000	...	...	1,300	1,500	...	62.7
B. C. Elec. Ry., Victoria	879	1,000	...	19.5	286	350	...	15.1	165	200	...	6.01	1,515	1,000	...	...	672	400	...	60.2
Burbank P. S. Dept.	....	....	...	60.0	....	....	...	15.0	....	....	2.0	...	....	....	...	...	....	....	...	40.0
†Calif. Elec. Power	600	1,500	1.0	70.0	800	700	5.0	25.0	400	400	5.0	15.0	200	300	100	...	100	300	...	...
Calif. Oregon Power	2,000	2,100	5.0	70.0	1,600	1,700	10.0	45.0	4,000	4,500	5.0	40.0	1 600	2,500	175	...	175	200	...	89.0
Calif. Pacific Utilities	1,374	1,700	5.0	70.0	1,167	1,500	2.0	36.0	1,838	1,900	3.0	24.0	....	....	....	...	....	....	...	75.0
Cheyenne L. Fuel & P.	....	....	...	55.0	....	....	...	25.0	250	....	...	10.0	600	....	300	...	300	....	...	...
Coast Counties G. & E.	250	....	30.0	...	450	....	20.0	...	....	....	20.0	...	....	....	....	...	....	....	...	...
El Paso Elec.	2,630*	4,800	4.3	72.0	842*	1,200	1.0	22.8	53.1*	900	1.5	15.7	....	450	....	...	....	175	...	80.0
Ely L. & P.	....	....	...	60.0	....	....	...	90.0	....	....	...	90.0	....	....	....	...	....	....	...	...
Eugene Water Board	....	....	...	...	....	....	...	65.0	....	....	...	35.0	....	....	....	...	....	....	...	...
Frontier Power	....	....	...	60.0	....	....	...	10.0	....	....	...	2.0	....	....	....	...	....	....	...	80.0
Glendale P. S. Dept.	1,000	1,000	...	...	700	1,000	...	17.0	100	200	...	2.0	....	....	....	...	....	....	...	...
Hawaiian Elec.	8,000	10,000	...	85.0	4,000	5,000	...	30.0	4,500	5,000	...	20.0	6,750	5,000	2,250	...	2,250	5,000	...	...
Idaho Falls Elec. Light	....	....	...	75.0	....	....	...	55.0	....	....	...	58.0	....	....	....	...	....	....	...	85.0
Idaho Power	5,000	12,000	5.0	80.0	6,000	7,000	1.0	64.0	2,000	3,300	5.0	35.0	5,000	8,000	1,000	...	1,000	2,000	...	85.0
Los Angeles Dept. W. & P.	....	....	...	75.0	5,385	11,000	1.9	6.7	2,746	5,600	2.5	3.1	....	....	....	...	....	....	...	75.0
Modesto Irriga. Dist.	....	....	...	70.0	....	....	...	30.0	....	....	...	15.0	....	....	....	...	....	....	...	...
Montana Power	....	....	...	72.0	4,000	5,000	...	30.0	2,400	3,000	...	5.2	....	....	....	...	....	....	...	...
Mountain States Power	....	....	...	35.0	....	....	...	30.0	....	....	...	25.0	....	....	....	...	....	....	...	...
Pacific P. & L.	7,321§	....	...	76.0	7,142	....	...	39.0	6,699	....	...	28.0	7,962‡§	....	....	...	....	....	...	77.0
Pacific P. & L.	....	....	...	76.0	....	....	...	39.0	....	....	...	28.0	....	....	....	...	....	....	...	77.0
Pasadena L. & P. Dept.	....	....	...	...	624	900	2.0	9.0	101	150	...	3.0	....	....	....	...	....	....	...	70.0
Portland Gen. Elec.	....	....	10.0	68.0	....	....	25.0	48.0	....	....	3.0	33.0	....	....	....	...	....	....	...	...
Provo P. U. Dept.	275	350	...	...	300	400	...	22.0	400	500	...	13.9	100	150	225	...	225	30	...	70.0
P. S. of Colo.	....	....	...	60.0	....	....	...	8.0	....	....	1.5	...	....	....	....	...	....	....	...	15.0
P. S. of N. M. (Deming)	30	100	50.0	35.0	5	10	...	4.0	....	....	...	...	9	15	13	...	13	25	...	80.0
P. S. of N. M. (Santa Fe)	200	300	50.0	65.0	10	15	2.0	...	8	8	...	0.5	300	300	100	...	100	150	...	...
Puget Sound P. & L.	25,100	28,900	...	65.0	20,500	25,625	...	45.0	13,900	13,900	...	30.0	....	....	....	...	....	....	...	...
Riverside L. Dept.	....	....	...	...	307	....	...	24.0	63	....	...	3.5	....	....	....	...	....	....	...	...
Sacramento Mun. Util. Dist.	2,659	2,900	...	...	536	600	...	....	365	400	...	...	3,943†	4,000†	....	...	....	....	...	...
San Diego G. & E.	13,500	15,000	...	...	3,200	4,000	...	...	2,200	3,000	...	...	9,500	10,000	5,000	...	5,000	7,500	...	...
†Seattle City Light	....	....	...	...	7,000	8,000	17.0	72.0	8,000	10,000	22.0	34.5	....	....	....	...	....	....	...	...
Sheridan County Elec.	....	....	...	70.0	....	....	...	10.0	....	....	...	...	....	....	....	...	....	....	...	80.0
Sierra Pacific Power	1,100	1,300	15.0	72.0	960	1,100	18.0	...	720	900	5.0	22.0	....	....	....	...	....	....	...	...
So. Calif. Edison	16,000	36,000	...	60.0	9,000	10,600	...	57.0	3,500	4,700	...	3.5	23,000†	37,300†	....	...	....	....	...	65.0
So. Colorado Power	1,800	1,800	...	80.0	475	500	...	9.0	342	500	...	5.0	1,750	2,000	450	...	450	600	...	80.0
So. Nevada Power	600	700	5.0	95.0	420	560	5.0	20.0	450	600	4.0	85.0	600	700	175	...	175	200	...	93.0
Tacoma City Light	....	....	...	...	....	....	...	...	....	....	...	51.8	....	....	....	...	....	....	...	90.0
Telluride Power	300	200	20.0	55.0	200	200	10.0	62.6	300	150	...	5.0	....	....	....	...	....	....	...	48.0
Tucson G.E.L. & P.	....	....	...	78.0	....	....	...	20.0	....	....	...	4.0	....	....	....	...	....	....	...	...
								11.0												

	IRONERS			FREEZERS			CLEANERS			RADIOS			AIR CONDITIONERS — Evaporative			AIR CONDITIONERS — Refrigeration		
	1947 Sales	1948 Quotas	% Sat.	1947 Sales	1948 Quotas	% Sat.	1947 Sales	1948 Quotas	% Sat.	1947 Sales	1948 Quotas	% Sat.	1947 Sales	1948 Quotas	% Sat.	1947 Sales	1948 Quotas	% Sat.
Utah P. & L.	9,500	....	25.0	75.0	7,000		....	....	25.0	40.0	7,000	....	....	14.4	7,000	....	2,000	....	87.0
Washington Water Power	9,187	10,000	1.0	75.0	8,605		8,000	2.0	40.0		7,133	7,200	1.0	35.0	9,583†	12,000†	....	....	60.0
Western P. S. Co.	185	300	5.0	40.0	53		100	10.0	7.0		5	20	....	1.0	229	250	57	150	60.0
B. C. Elec. Ry., Vancouver	450	900	2.8	90	100		5,000	5,000	64.0		25,000	20,000	95.0		....	....	....	....	....
B. C. Elec. Ry., Victoria	115	150	2.6	21	40		1,017	750	68.0		4,902	3,500	92.0		....	....	....	....	0.5
Burbank P. S. Dept.	....	....	10.0	....	....		....	....	50.0		....	....	80.0		....	....	0.5	....	
Calif. Elec. Power	100	125	....	100	200		50	50	....		....	....	....		50	100	....	....	....
Calif. Pacific Utilities	....	....	5.0	150	200		900	1,500	70.0		....	....	96.0		100	150	....	50	100
Cheyenne L. Fuel & P.	....	....	20.0	....	....		....	....	75.0		....	....	100.0		....	....	....	....	....
Coast Counties G. & E.	200	....	....	300	....		1,000	....	....		2,500	....	....		25	....	....	10	....
El Paso Elec.	....	75	....	353	400		....	585	....		....	6,000	....		....	1,800	....	....	20
Ely L. & P.	....	....	90.0	....	....		....	....	60.0		....	....	70.0		....	....	100.0	....	....
Frontier Power	....	....	5.0	....	....		....	....	....		....	....	95.0		....	....	1.0	....	....
Hawaiian Elec.	600	750	....	1,000	1,500		....	....	....		1,500	1,500	....		....	....	....	....	....
Idaho Falls Elec. Light	....	....	20.0	....	....		....	....	90.0		....	....	85.0		....	....	....	....	....
Idaho Power	500	1,000	5.0	700	1,000		2,800	3,500	75.0		15,000	16,000	95.0		500	800	5.0	100	300	2.0
Modesto Irrig. Dist.	....	....	3.0	....	....		....	....	70.0		....	....	95.0		....	....	5.0	....	....	1.0
Pacific G. & E.	12,000	17,000	11.0	6,500	8,000		36,000	35,000	66.0		145,000	130,000	97.0		14,000	18,000	6.6	300	350	0.1
Pacific P. & L.	1,299§	....	14.0	1,243§	....		4,674§	....	65.0		18,803§	....	96.0		2,352§	....	....	....	....	....
Portland Gen. Elec.	....	....	26.0	....	....		....	....	....		....	....	100.0		....	....	....	....	....	....
Provo P. U. Dept.	15	20	....	....	....		....	....	....		....	....	....		....	....	....	....	....	....
P. S. of Colo.	....	....	10.0	....	....		....	....	75.0		....	....	95.0		....	....	1.0	....	....	....
P. S. of N. M. (Deming)	3	10	3.0	6	10		23	50	35.0		50	100	80.0		17	40	30.0	....	1	....
P. S. of N. M. (Santa Fe)	25	25	2.0	50	50		200	300	10.0		400	450	....		2	5	....	....	....	....
Sacramento Mun. Util. Dist.	207	250	....	136	300		3,706	4,200	....		40,000	36,000	....		972	1,000	....	....	....	....
San Diego G. & E.	3,000	3,500	1.0	3,000	4,500		11,000	12,000	....		....	....	....		....	5	....	....	....	....
Sheridan County Elec.	....	....	4.0	....	....		....	....	65.0		....	....	95.0		....	....	....	....	....	....
So. Calif. Edison	4,000	8,200	4.0	1,900	5,000		9,000	30,000	....		35,000	66,000	....		2,500	5,000	....	200	500	....
So. Colorado Power	210	400	3.0	175	300		1,675	2,500	90.0		3,950	4,000	95.0		130	250	0.5	2	10	....
So. Nevada Power	60	80	6.0	100	150		300	400	97.0		600	650	85.0		1,000	1,250	95.0	50	75	19.0
Telluride Power	....	....	....	100	150		....	....	....		....	....	98.0		....	....	....	....	....	....
Tucson G.E.L. & P.	....	....	2.0	....	....		....	....	....		....	....	....		....	....	75.0	....	....	....
Utah P. & L.	1,000	....	3.5	1,200	....		9,000	....	75.0		20,000	....	100.0		....	....	....	....	....	....
Washington Water Power	1,885	2,500	8.0	1,385	3,500		4,933	5,500	84.0		20,896	25,000	93.0		425†	500†	1.0	....	....	....
Western P. S. Co.	33	75	4.0	24	40		192	300	70.0		1,267	1,000	90.0		....	....	3.0	....	....	....

* Figures for 8 months only. † Combined figures, conventional and automatic washers. ‡ Company sales only. Dealer sales not reported. § Figures for original P. P. & L. territory only.

on water heaters, vacuum cleaners, radio and hand irons, but on other appliances, no. Consumer resistance to appliance prices is not noticed in the case of appliances in short supply, such as ranges, but in those which are abundant, yes, according to A. W. Trimble, vice-president and treasurer.

Pacific Gas and Electric Co., according to O. R. Doerr, general sales manager, is making its estimates of 1948 volume of appliance sales on the assumption that there will be a free supply of material and no serious work stoppages caused by strikes or other difficulties. In December the company announced that it would retire from the direct merchandising of appliances. Its figures on customers are those after a transfer of 53,056 customers to the Sacramento Municipal Utility district. Its annual kilowatt-hour consumption per residence owner of 1,607 includes master metered apartments. It would be 1,555 excluding these, and 1,296 if rural figures were not included. If apartment figures were not included it would be 1,700. Consideration is being given to commissions on dealers' sales of major electrical appliances. Appliance deliveries seem to be below normal but progressive improvement is noticeable. On ranges, refrigerators, automatic washing machines, and dishwashers, there is still a shortage of supply. No major promotion is planned until supply meets demand.

Pacific Power & Light, says D. B. Leonard, sales manager, finds it especially difficult to furnish the statistical information this year, as a result of the merger of *Northwestern Electric Co.* with *Pacific Power & Light Co.* Neither has it been common practice for Portland General Co. and Northwestern Electric Co. to secure up-to-date complete data from dealers on appliance sales. The unavailability of information from that source makes it impossible to answer the questions on dealer sales from the entire Pacific territory, although the company maintains a reporting service for dealers in what used to be the Pacific Power & Light Co. territory in eastern Oregon and Washington. Business conditions in the territory have been good. In many areas estimates have been exceeded by substantial margins. The company does not merchandise. It reports some consumer resistance to prices. Its promotions will be limited to electric cookery, water heating, lighting and adequate wiring.

Pasadena Municipal Light & Power Department, according to E. L. Bettannier, general manager and chief engineer, does not merchandise, reports business conditions good, and says that the principal local factors

Dealer Cooperation Programs

Utility Territory—(Dealer association or cooperative league in the area—in parenthesis)	Utility Merchandises Yes	Utility Merchandises No	DEALERS Present number	DEALERS Number pre-war	DEALERS 1947 Increase	DEALERS Number Failed	No. of customers per dealer	Soundness	Utility Sales or Cooperative Program	No. girls	Plan to add	Home Service Program
Alameda Bur. of Elec.		X	7	4	3	1	1,794	Excellent				
Anaheim, Dept. L. P. & W.		X	..	..	..	..	..		None.			
Arizona Edison		X	50	..	..	..	294	Sound	Cooperate with ads, ad allowances, field men, display helps, home service, campaigns, demonst.	1	0	Home and public demonst.
Burbank P. S. Dept. (Burbank Elect. Appl. Dl. Assn.)		X	24	20	1	0	895	Good	Cooperative program, ad. helps, range wiring, campaigns, home service.	1	0	Home and school demonst.
B.C. Electric Ry., Vancouver (B.C. Div. Canadian Assn. Rad. & Apl.)		X	285	125	..	2	406	Sound—due to diversification	Dealer Development Dept., ad helps, ad allowances, field men, window display help, service	6	0	Group meetings, dealer appliance demonst. Home calls,
B.C. Electric Ry., Victoria (Dealer Div. Dept. & League)		X	101 ..	16 ..	.. ..	.. 25	.. 0	.. 75% sound	dept. exchange, home service, demonstrations, campaigns, sales training classes for dealers, personnel, bus. mgmt. conferences.	3	0	schools, kitchen and laundry planning.
Calif. Elec. Power	X		142	..	30	?	246	Not good—lack merchandise	Company sells complete line, competes on fair basis, keeps dealers competitive on terms and wiring allowances, etc.	4	0	Complaints, new appliances, old customers, schools.
Calif. Oregon Power		X	180	150	10	..	255	Fair	Ad help, home service, promotion campaigns, sales training course for dealers.	1	0	Dealer calls, schools, home.
Calif. Pacific Utilities		X	113	63	12	0	161	Diversified—Excellent	Dealer program, ad help, field men, window display help.	0	1	Home service demonst.
Central Ariz. L. & P.		X	200	150	25	5	230	Excellent	Dealer program, ad helps, field men, display help, home service, campaigns, market analysis.	4	6	Market analysis, lighting, appliance usage.
Cheyenne L. F. & P.	X		35	15	20	3	215	Not too sound	Dealer program, ad helps, field men, display helps, home service, campaigns.	0	0	
Colorado Springs P. U. Dept.		X							None.			
Coast Counties G. & E. (NERA)	X		122	57	65	0	232	Satisfactory	Selling ranges, water heaters, refrig., freezers, air heaters. Dealer program, ad helps, field men, home service, campaigns.	1	0	No program.
El Paso Electric	X		120	16	4	2	312	Old ones strong New, weak	Sell complete line. Dealer program, ad helps, field men, home service, wiring allowances, campaigns.	1	3	Demonst. and help. cust. on new ranges for Co. & dealers.
Ely L. & P.		X	10	8	1	0	126	Good	None.			
Eugene Water Board		X	60	20	..	..	204	Probably over supplied	None.			
Frontier Power		X	25	20	0	0	190	Overcrowded	Dealer program, ad helps, window display helps.			
Glendale P. S. Dept.		X	60	12	..	..	483	Not too sound	No program as yet except home service and wiring allowances.	1		
Hawaiian Electric	X		204	75	..	..	250		Electrical Development Advisory Service, ad helps, home service, campaigns.	8	0	
Heber L. & P. Dept.		X	6	5	1	..	233		None.			
Idaho Falls Elec. L. Dept.		X	65	25	6	0	69	Fair	None, but do advt., give ad allowances, field men, home service, range wiring, etc.			
Idaho Power	X		600	500	20	0	138	Satisfactory	Sell major appliances in rural areas where needed. Dealer program, field men, ad helps, display helps, home service, campaigns, enlist distributor cooperation.	2	4	Ltg., group demonst. all service.
Imperial Irrig. Dist.		X	35	..	..	..	412	Fair	Dealer program, ad helps, home service.			
Logan City Mun. Elec. L. Dept.		X	10	3	..	..	..		None.			
Los Angeles Dept. W. & P. (So. Cal. Radio & Elect. Appl. Assn.)		X	800	180	100	29	621	Good	Dealer program, ad helps, field men, display help, home service, wiring allowances, prospect distribution, dealer salesmen training and repair service, demonstration in stores.	7	2	Home calls, dealer store demonst. (see story).
Modesto Irrig. Dist.		X	30	20	..	..	476	Fair	Ad helps.			
Montana Power		X	1,200	1,102	..	..	14	Good if appl. available	Dealer program, field men, home service, campaigns, etc.	4	5	Dealer assistance and customer service.
Mountain States Power		X	225	175	15	0	334	Satisfactory	None.	0	0	No program in prospect.
Pacific G. & E. (No. Calif. Elec. Bur.)		X	2,231	1,321	..	..	433	Very good	Policy being revised as merchandising stopped. Ad helps, field men, home service, commissions on dealer sales of major appliances.	12	1	Work with groups to educate customers re appl.
Pacific P. & L. (N.W. Appl. Ret. Assn.)		X	600	425	..	..	207	Good	Merged with Northwestern. New policy evolving.	4		
Pasadena, Mun. L. & P. Dept. (Pasadena Rad. & Elec. Dlrs. Assn.)		X	77	30	0	0	391	Good	Dealer help program, field men, display helps, home service, wiring furnished, etc.	1	0	Demonst. ranges in homes.
Portland Gen. Elec. (N.W. Appl. Ret. Assn.)		X	400	200	50	10	388	Very good	Program includes field men, home service, store layout help, sales training and assistance.	2	0	Demonst. & assist to new range users.
Provo P. L. Dept. (Inter[illegible]lec. Assn.)		X	12	11	0	0	235	Good	Program, ad helps, home service, range wiring furnished, campaigns.	1	0	Teach appl. use and assist dealer sales.
P. S. [illegible] of Colo.	X		126	52	12	6	1,185	Good but [illegible]	[illegible]			

PRINT IN BINDING

P. S. Co. of Colo. (Rocky Mt. Elec. League)	X		126	52	12	6	1,185	Good but supplies inadequate	Dealers & Bldrs. Dept. field men, display helps, campaigns, sales training.	2	0	Lighting demonstrations.
P. S. Co. of N.M.												
—Albuquerque	X		7	4	0	0						
—Deming	X		7	4	0	0	212	Sound	Program: part time dealer field men, ad helps, range wiring furnished.			
—Las Vegas	X											
—Santa Fe	X		15	7	0	0	393	Sound if diversified	Advertising on radio, newspapers.	7	1	Dealer cooperative.
Puget Sound P. & L.	X*	X	717	300	..	..	337	Good	Dealer program, field men, home service.		1	Ranges, w.h., air cond., home freezers.
Riverside Elec. L. Dept.		X	28	10	18	0	457	Seem sound	Program: ad helps, home service, wiring furnished, campaigns.		0	Dealer & customer contacts & demonstrations.
Sacramento Mun. Util. Dist. (Sacramento Elect. Club)		X	125	..	2	1	460	Good generally	Dealer, field men, home service campaigns, dealer publication. None.	1		
Salt River Valley Water Users		X										
San Diego G. & E. (Bur. Radio & Elec. Appl.)		X	450	250	25	25	272	Better than average	Most of program through bureau plus field men, display helps, campaigns.			
Seattle City Light (Assn. of Appl. Dlrs.)		X	500	100	..	..	187	Bus. won't support no. of dealers	Selling ranges and 50 gal. or larger automatic water heaters, give ad help, home service, wiring, campaigns, field men.	4	0	Asst. to dealer & custom. in training, appliance use.
Sheridan Div. Mont.-Dak. U.		?	10	7	..	..	62	Good	Ad helps, ad allowances, home service.			
Sierra Pacific Power		X	125	65	12	3	158	Good	"Reno plan is permanent"—Ad helps and allowances, field men, home service, range wiring.	0	2	Customer contact, dealer asst., cooking schools.
So. Calif. Edison		X	1,433	400	460	?	427	Unknown	Program: ad helps, field men, display helps, home service, campaign, sales training.	4	6	School class present. Women's clubs, home calls.
So. Colorado Power (NERA & Elec. League)	X		63	25	14	0	553	Good	Selling major and new appliances. Program: ad helps, field men, display helps, home service, campaigns. None.	1	?	Consumer educat. & dealer help.
So. Nevada Power		X	23	5	4	1	291	85% sound	Sell ranges, water heaters. Program: ad help, home service, side arm water heater trade-in plan.	1		Work with schools.
Tacoma City Light (Tacoma Appl. Retailers Assn.)	X											
Telluride Power (Intermt. Elec. Assn.)		X	36	14	0	0	194	Fairly sound	Sell major appliances. Dealer helps, ads, field men, display helps, home service.	0	1	
Tucson G. E. L. & P.		X	50	30	..	..	582		Program: ad helps, display helps.			
Utah P. & L. (Intermt. Elec. Assn.)		X	1,581†	800	70	?	145	Good	Complete cooperation program, ad helps, display helps, home service, campaigns, field men.	4	4	Coop. with schools & dealers, rural extensions, etc.
Vallejo E. L. & P.		X	8	5	0	0	1,472	Good	Ad help.			
Washington Water Power (Inland Emp. Elec. Dlrs. Assn.)		X	360	290	20	3	250	Good	Complete program with IEEDA, ad helps, field men, display helps, home service, campaigns, sales training, accounting service.	12	0	Club groups, schools & info. and service to customers.
Western P. S. Co.		X	11	8	1	0	320	Looks o.k.	Program: ad helps, display helps, field men, home service, range wiring.	1	0	

* In Seattle only.
† Includes 665 dealers handling lamps only.

affecting sales are slow deliveries to dealers of appliances. It also reports a lack of interest on the part of plumbers in the sale of electric water heaters. The range wiring situation is solved by making the installation and loaning the equipment to the user without cost. Promotion will be carried on for ranges and water heaters.

Portland General Electric Co. is not in a position to estimate appliance sales at this time, says A. C. McMicken, general sales manager. Market conditions have been good. The principal local factor creating sales has been an inauguration of the all-electric rate schedule, which has tended to increase the sale of ranges and water heaters. Deliveries are not yet normal on ranges and refrigerators. There has been friction between plumbers and electrical dealers over water heater sales. There is some consumer resistance to prices. No major promotions are planned. Specifically, Mr. McMicken says:

"Our load continues to grow, and the net system peak-hour load of 368,000 kw. on Dec. 10 may be compared with a system peak hour for last year of 326,000 kw. We rather expect a system peak either this month or next of around 374,000.

"The growth of electric water heating load since the inauguration of residential Schedule 9 in November 1945 has been phenomenal. This schedule requires customers to apply for it, and they must qualify by having and using both an electric range and an electric water heater. As of Nov. 30, 1947, we had a total of 47,188 such customers, which, of course, does not include all customers having electric water heaters, as many customers served under Schedules 8 and 41 have electric water heaters; and the figure does not include customers in Salem, Oregon, served under residential Schedule 2. As nearly as we can estimate, we now have an electric water heater saturation of approximately 33%. At the end of January, 1946 we had received 16,000 applications for Schedule 9. At the end of January 1947 the number had increased to 34,401; and, as indicated above, at the end of November 1947 had increased to 47,188. The average use of energy by customers served under Schedule 9 is 8,005 kilowatt-hours per annum."

Provo Department of Utilities has a policy of reimbursing the owner $25 on an electric range and $10 on electric water heater for wiring where it constitutes a new load to the lines, according to T. J. Oldroyd, office manager. The department expects to continue its policy of reimbursing owners

for ranges and water heater installations on the same basis. It notes consumer resistance to prices and declares appliance deliveries are not yet normal.

Public Service Co. of Colorado plans to merchandise electric ranges, water heaters, dishwashers, disposals, certified lamps, electric ironing machines, home freezers, blankets and comforters, or any new appliances that require pioneering or promotion, according to G. B. Buck, vice-president. However it will have a strong program of dealer cooperation with promotional campaigns, educational and training assistance. This will be developed through its dealers and builders department. The demand for known makes is still good and the supply is inadequate. Steady employment in the area still stimulates sales. Replacement buying is being delayed because of high prices. There is a rapid building expansion that is helpful to the market. Most of the area served is also served with natural gas, which is a more economical fuel for cooking and water heating, and makes for low saturations of electric appliances. There seems to be some friction between plumbers and electrical dealers regarding electric water heaters and sinks. Consumer resistance to prices is evident. No major promotions will be had on ranges, water heaters, freezers, because of inadequate supply, but certified lamps, electric blankets and comforters will be promoted.

Public Service Company of New Mexico serves in Albuquerque, Deming, Las Vegas, and Santa Fe. In general the market conditions are good as demands are not being met because of shortage of merchandise. There has been a rapid growth of the various communities and low unemployment. None of the divisions do direct merchandising. The company is trying to get sufficient generating capacity to meet the demands. The dealer situation is sounder for those that have other items than electrical appliances to sell. Deliveries have been far, far from normal, according to J. E. Flynn, purchasing agent. In fact he feels that the territory is not getting its share of appliances. Plumber-dealer friction is noted on water heaters, dishwashers, disposals. Price resistance is growing.

Puget Sound Power & Light Co. is likewise suffering from power shortage. "With present load conditions the way they are," says Pat Johnson, vice-president, "we will carry along with the same type of sales program as in the past few years, that is, we will just take care of existing business with no special sales effort. In general we would say that the appliance market has been very good in this area but due to the critical power shortage, felt throughout the entire Northwest, it is not feasible for us to take an active part in promoting load building appliances on our lines at this time. We still maintain our dealer and home service sales organization, as they are of much help to the dealers and customers in these times." The company will merchandise ranges and water heaters only in the city of Seattle, where it is in direct competition with Seattle City Light, which likewise merchandises. Market conditions have been good. The principal lack has been that of merchandise. Consumer resistance is beginning to be evident.

Display table containing helpful literature for customers was always attractively decorated, in the lobby of the Northwestern Electric Co offices

Riverside Electric Light Department will endeavor to lower its rate if possible, according to C. G. Dahlgren, new business agent, and will carry on cooking schools to stimulate range sales. It will have a home service girl working on demonstrations of ranges, home freezers, and the promoting of water heating and air conditioning.

Sacramento Municipal Utility District is not merchandising and Dan K. Coyle, sales manager, says he believes this will be its permanent policy. It will carry on limited sales promotion campaigns, chiefly on adequate wiring. Due to the power shortage and limited system capacity no full-scale appliance promotions are planned at present, said Coyle. However, promotion is to be pushed in new subdivisions which are being constructed with adequate distribution capacity. The Sacramento Electric Club may expand its name and nature to a Sacramento Electrical League during 1948. Business conditions have been strong. Sales have exceeded estimates. Deliveries on ranges are improving but there is an acute shortage of deluxe models. Water heaters are in good supply. No customer resistance is apparent as yet. Some friction has developed between plumbers and electrical dealers. The dealers appear to resent the attitude of the plumbers' union and are talking of taking united action to secure revision of city ordinances.

Salt River Valley Water Users Assn., says O. L. Norman, general manager, serves a territory that is entirely rural and scattered over the major portion of three counties. Due to this fact, and because purchases of electrical appliances are made at many different places in the several urban communities, the association is unable to keep in close touch with the merchandising conditions. It is making rural extensions to domestic customers as fast as labor and materials will permit, and endeavoring to take care of natural increases in all types of business. Deliveries seem to be approaching normal in appliances. Consumer price resistance is evident. Promotion will be carried on for room heating and home freezers.

San Diego Gas & Electric Co. The dealer situation in San Diego is better than average in the nation, although the ratio of dealers to customers is very high. The Bureau of Radio and Electrical Appliances, however, stimulates the market and conditions are good. There has been an increase in population and pay rolls, according to E. W. Meise, superintendent, domestic electric sales. The company no longer merchandises, but will promote electric ranges, water heaters, home freezers and adequate wiring. Some friction is noted between plumbers and electrical dealers over sales and connections.

Seattle City Department of Lighting will continue to merchandise 50 gallon or larger automatic water heater tanks. Its figures are for sales on City Light lines only. Replacement figures reflect the campaign to remove side-arm type water heaters last year. Business conditions are reported very good by P. C. Spowart, electric sales manager. The principal factors are the low rate for electricity and new residence construction. There is no serious friction between plumbers and electrical dealers. Deliveries are short on all appliances except automatic tank water heaters. Price resistance is beginning to be evident. Promotions will be carried on for ranges, water heat-

ers, home freezers, electric dishwashers, automatic washing machines, and clothes dryers.

Montana-Dakota Utilities Co.'s Sheridan, Wyoming division has not definitely decided whether it will merchandise or not, according to Thomas W. Hughes, division manager. Business conditions have been good. Estimates made after the war are being bettered. There is a lack of merchandise, however. No promotions are planned at this time.

Sierra Pacific Power Co. During 1947 there has been 215 horsepower of refrigerated air conditioning installed in the Reno area. A. L. Pierce, manager, new business, declares the Reno plan of dealer selling is permanent. Market conditions have been good. Deliveries have been poor. Promotions will be carried on for ranges, water heaters, freezers, air conditioning and all promotion will be done through and in cooperation with the dealer.

Southern California Edison Co. intends that major industry campaigns will be held on all major items as soon as sufficient merchandise is available. Appliance deliveries are not yet normal. The extraordinary growth of the territory, H. C. Rice, manager of domestic sales, feels has not been properly recognized. Yet he continues, "one of the most interesting facts, which has been overlooked, I think, in connection with the whole electrical situation, is that considerably more merchandise has been delivered in 1947 than was produced in 1941, the last year in which unrestricted merchandise was permissible. This was in the face of what appeared to be a shortage of all types of electrical equipment. For this type of production, 1948 should come very near meeting the backlog of demand that has been built up during the war years (barring steel shortages and other restrictions beyond the control of the manufacturers). 1948 should be a very exciting year. In fact, as Rock Smith, of Deepfreeze says, it could be the 'year of decision.'" As to the soundness of the dealer situation, Rice says that until adequate merchandise is available the situation is unknown. He feels that sales training for dealer salesmen is essential for future success. The figures given in the tables are estimated, based on dealer reports, which however, are not considered complete since there are 1,425 dealers and reports are received on an average from 450. Washer figures evidently include automatics.

Southern Colorado Power Co. Its figures are based on 11 months of the year with an estimate for the last month, which E. H. Pemberton, supervisor of sales promotion, feels is fairly close to the final figures. His estimates for next year, he says, are somewhat biased by what amounts of equipment he thinks will be delivered during the year. "I feel that we as an electrical industry have had a very successful year considering all conditions. Merchandise is still very short although some lines are picking up appreciably. The outlook is not too rosy for the early part of 1948, especially if rationing should go back into effect in the use of steel and some other metals. Repair parts are just about as tough to get as during the worst of wartime. The manufacturing companies have promised some relief in the near future. Too much merchandise is damaged in transit, much beyond use by the consumer until replacement parts arrive and are installed on the equipment."

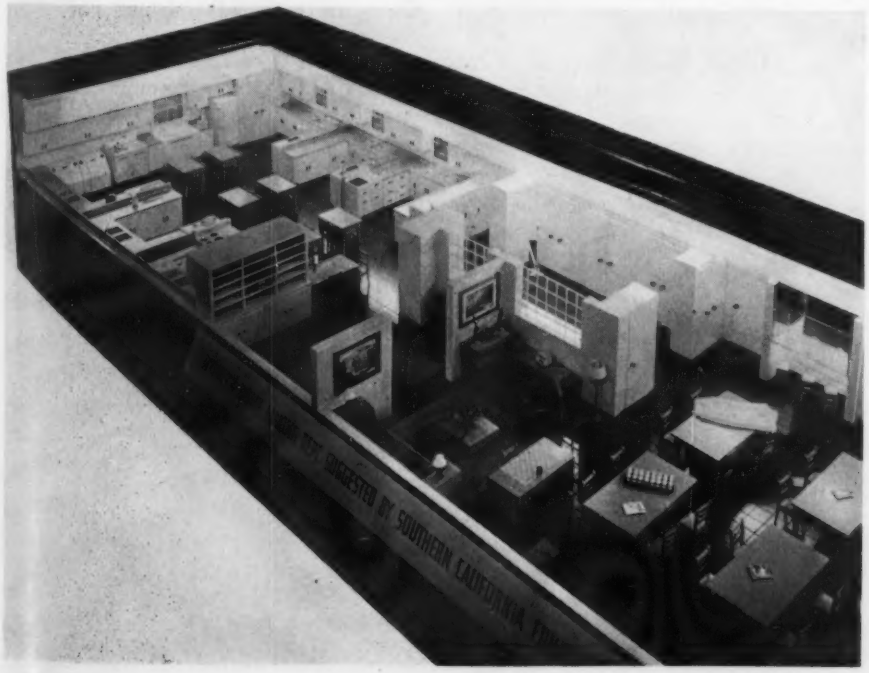
The company merchandises but confines it principally to major appliances and to new ones that need pioneering. Business conditions have been good. Promotions will be carried on by the Electrical League on ranges, water heaters, home freezers, automatic home laundries, and electric kitchens. Efforts are being made to stabilize the cost of range wiring for utility participation in the cost. There has been some friction reported between plumbers and electrical dealers but not enough to bother sales. Some resistance to prices has been evident.

Southern Nevada Power Co. reports excellent conditions with non-delivery and slow completion of residences as principal factors affecting sales. Cleaners are the exception, according to S. J. Lawson, general manager. The company does not merchandise.

Tacoma City Light does not plan to change its policy of direct merchandising of ranges and water heaters, according to J. Frank Ward, superintendent of the lighting division. It plans to authorize a trade-in credit for side-arm water heaters turned in on the purchase of 40-gallon or larger automatic tanks in a manner similar to that in Seattle. This will aid dealers in the sale of automatic water heating. Conditions are very good. Estimates of sales are standing up except on home freezers. The housing shortage is a factor affecting sales. There is a price resistance becoming evident.

Telluride Power Co., Richfield, Utah, will continue its direct merchandising of major appliances only. During the year the Intermountain Electrical Assn. established a chapter known as the Sevier Chapter, operating in the territory, and the company will cooperate with it closely, according to W. O. Cluff, sales manager. Business conditions have been good. Deliveries have been satisfactory with the exception of a few items, such as mixers, toasters, and waffle irons. Consumer resistance is said to be very evident. The company will promote ranges, water heaters, and commercial lighting.

With this model of what the home-making classrooms of a school should be, Edison helps schools in its territory to modernize, and future generations of housewives will have been trained to use and enjoy modern electric appliances



Tucson Gas Electric Light & Power Co. does not merchandise and has no means of estimating figures on sales of appliances from dealers, according to A. R. Seaman, commercial manager. Deliveries are inadequate. Available capacity is a problem here too.

Utah Power & Light Co. and its subsidiary *Western Colorado Power Co.* made no estimates of 1948 potential sales because nothing definite is known of the availability of merchandise. All of 1948 figures are expected to be up approximately 10% over 1947 sales if the merchandise is available to sell. The number of dealers listed, namely 1,581, includes 665 dealers who handle lighting equipment only, such as lamp bulbs and table and floor lamps. The company has a complete program of cooperation in assistance to the Intermountain Electrical Assn. which consists of five groups, with 169 dealer members. It is estimated by W. A. Huckins, sales manager, that at least half of the replacement ranges and refrigerators have been repaired and are now in service in other homes. Business conditions have been good. Estimates have been bettered in some cases. Economic conditions are the principal factor affecting sales. There has not been any appreciable consumer resistance reported.

Washington Water Power Co. is experimenting with its plan not to merchandise, but to rely upon dealers for sales of all appliances. It has an active program in cooperation with the Inland Empire Electrical Dealers Assn. It will promote step-saving kitchens and modern laundries and lighting, and is working with the dealers association to bring wiring costs to a legitimate profit level in order not to discourage the sales of electric ranges. Consumer resistance is becoming evident. Business conditions are very good but shortages of supplies and equipment are still persistent.

Western Public Service Co. of Laramie, Wyo., plans to merchandise all appliances except radios. Reports excellent business conditions, and that estimates are being met. Principal factors in the area are cattle prices, railroad traffic and attendance at University of Wyoming, all of which are booming, according to W. L. Breslin, president. A price on range wiring was recently secured by conference between the company and contractors. The previous wiring prices lost many sales. There has been some friction between plumbers and electrical dealers, but the principal trouble comes over the installation of electric sinks. Appliance deliveries are not yet normal.

Commercial Cooking

Like other promotional programs, the pushing of commercial electric cooking on a large scale is not in prospect because of the tight power situation and the facilities to serve. On the other hand, supplies of heavy-duty commercial cooking equipment are becoming more available and it is to be expected that dealers will themselves actively sell wherever there is an opportunity.

What the utility companies of the West plan to do in this respect is briefly summarized in the following:

B. C. Electric Railway says it has no specific program but it is going vigorously after business. In Victoria, M. C. Trueman, sales manager, says, "owing to inadequacy of present power supply to handle a substantial increase in peak loading and the lack of a rate adapted to this type of load, it is being discouraged."

California Electric Power will have personal contact by qualified representatives in the field.

California Pacific Utilities plans to furnish contractor-dealers with prospects and catalog materials on the equipment that is available.

Central Arizona Light & Power will push table-top cookery, waffle irons, toasters, etc. for commercial establishments.

Idaho Power Co. will make efforts to promote cooking and baking especially.

Los Angeles Department of Water & Power will continue its present policy of aggressive promotion of electric cooking, with expansion of manpower to take advantage of the backlog of demand and the greater availability of equipment, tying in with air conditioning and water heating (particularly boosters) for restaurant and other commercial uses.

Montana Power Co. will promote electric cooking particularly in towns where the company does not sell natural gas.

Neither Pacific Gas and Electric Co., Pacific Power & Light, nor *Portland General Electric Co.,* plans any particular activity in promoting this type of business. Portland General Electric says, "the only planned activity for 1948 is the usual cooperation and contacts with commercial cooking equipment dealers, restaurant owners, hotels, clubs, etc."

Provo City Department of Utilities says it plans to promote electric cooking.

Public Service Co. of Colorado says it will take care of the demand only.

Puget Sound Power & Light, which before the war was exceedingly active in the promotion of commercial electric cooking, will have no program until the acute power situation is relieved.

San Diego Gas & Electric Co. will make direct calls on prospects for heavy-duty and counter appliances.

Seattle City Light plans to promote heavy-duty ranges, bake ovens, hot-food tables and especially large-size automatic tank water heaters.

Southern California Edison Co., which also has a record of active promotion of this type of business, will have three men, specialists in this work, in the field. They will back them up with advertising and demonstration equipment.

Southern Colorado Power Co. at Pueblo will promote commercial cook-

Home economists of Utah Power & Light continued cooking and nutrition school in company office auditorium, in schools, clubs or in dealers' stores

ing to institutions and unit counter cooking equipment principally in the commercial field.

Tacoma City Light will make its usual contacts on non-electric users.

Telluride Power Co. plans direct mail and personal contact to promote commercial cooking.

Utah Power & Light will use direct mail and conduct special activities among its commercial sales group in fostering this type of business.

Washington Water Power Co. will promote all appliances in this field.

Western Public Service Co. at Laramie will sell counter cooking equipment itself.

Wiring Costs, Promotion

The part that cost of installation plays in respect to the market for electric ranges, water heaters and other major energy-using appliances is generally recognized. However policies and methods of approach to the problem vary a great deal. Some utilities subsidize the range wiring to a certain extent, others do not. The same is true as to the promotion of adequate wiring. Some utility companies or municipals do an extensive job of promoting adequate wiring and others let nature take its course.

A review of what the various companies do as declared in our questionnaires follows:

Arizona Edison Co. says the range wiring cost in its territory is around $50 and it does interfere with the sale of ranges. The utility is considering some subsidy.

Burbank City Department contributes $30 toward the range wiring. Costs range around $45.

B. C. Electric Railway reports high range wiring costs of around $85 in Victoria and about $75 in the Vancouver area. In Victoria some plans are being made to have the wiring financed. Costs so far have not interferred with the sale of ranges because there have not been enough ranges. In Vancouver a local industry-wide committee is studying the cost situation. The Red Seal program for promotion of adequate wiring is being carried on vigorously through the Electrical Service League. The league supplies plans and advice on adequate house wiring and to some extent on commercial wiring.

California Electric Power at Riverside, Calif., contributes nothing to range wiring cost, which is about $60, and is said to interfere with sales, but is trying to secure permission to reduce the rigid conduit requirements and install adequate service entrance equipment at the time the original

Stressing the "Better Living" theme in its advertising, Los Angeles Department of Water & Power also carries a message on certified adequate wiring

connection to a house is made. Assistance is given in the promotion of adequate wiring by qualified commercial representatives.

California Oregon Power reports a cost to wire of $47.50 which restricts sales to some extent. The utility does not contribute toward wiring cost, nor does it have a wire promotion program at the present time.

California Pacific Utilities, serving a number of small cities throughout California, Oregon and Nevada, reports an average wiring cost of $75 which does interfere with sales. It reports that dealers are bringing pressure on wiring contractors by adding electricians to do the wiring and handle servicing. The company calls meetings with contractors and dealers and supplies promotional materials to assist in adequate wiring development.

Central Arizona Light & Power Co. reports a very high range wiring cost within the city limits of Phoenix—$100, while it is only $60 outside the city limits. No subsidy is provided and so far the situation has not retarded sales. The company has no adequate wiring promotion at present.

Cheyenne Light Fuel & Power reports a $50-$60 range wiring cost which does not yet interfere with sales. There is no subsidy.

Coast Counties Gas & Electric Co. reports a $65 range cost, no subsidy and so far no interference with sales. It has an adequate wiring promotion under consideration.

El Paso Electric gets wiring for $42.50 which even so restricts the sales. It contributes $35 toward wiring cost.

Ely Light & Power Co., Nevada, reports a cost of $22 to which the utility contributes $5.

Eugene Water Board reports $75-$100 with apparently no restrictions on sales. No contribution is made toward cost. There is no wiring promotion program.

Frontier Power Co., Trinidad, Colo., reports a $40 cost. There is no evident interference with sales. There is no contribution made, nor is there an adequate wiring promotion program at present.

Glendale Public Service Department contributes $15 toward range wiring cost which averages $50. It does a general wiring promotion.

Hawaiian Electric reports an $80 average cost which has interfered with sales. There is no contribution made toward it but constant study is being made of the problem by all branches of the industry and the situation seems to be improving.

Heber Light & Power Plant in Utah reports a $40 cost for range wiring.

Idaho Falls Electric Light Department has a similar $40 cost with no interference with sales at present.

Idaho Power Co. reports a $50 average cost; makes no contribution toward the wiring. It carries a general day-by-day promotion with special shows and programs.

Imperial Irrigation District reports an average $75 cost which interferes with sales. The utility does not contribute toward it nor has it an adequate wiring program.

Los Angeles Department of Water & Power is very energetic in the adequate wiring program. It has field representatives specializing on the phase of new construction who are devoting full time to all contacts with architects, building and electrical contractors, manufacturers and home owners, emphasizing the importance of wiring. A considerable portion of the advertising is devoted to this subject. Outdoor illuminated signs are provided for typical model homes throughout the area. Wiring costs are unsettled and varying. They range between $60 and $200, and are reported to interfere with the sale of ranges. The utility contributes $35 for the first appliance and $10 for the second on a range and water heater only. It is endeavoring to stimulate competition and to develop a reasonable price.

Modesto Irrigation District reports a $75 price which interferes with sales.

Montana Power Co. says the price of $60, which is average in the territory, does not at present interfere with range sales but later it will. It has no definite plans yet regarding the problem. It carries on an advisory service to architects, builders and customers

in the promotion of adequate wiring.

Mountain States Power Co., with headquarters at Albany and serving in many parts of the West, reports an average of $60. The company's policy of installing range wiring gratis was abandoned several years ago. Although it has no adequate wiring promotion program it does some newspaper and radio advertising on the subject.

Pacific Gas and Electric Co., working with selected dealers and electric wiring contractors, is endeavoring to solve the range wiring cost problem. Costs in its territory range from $75 to $110 and are interfering with sale of ranges. Its adequate wiring promotion program is implemented through field contacts and extensive advertising.

Pacific Power & Light Co., which includes former Northwestern Electric, reports an average cost of $55 which has not interfered. It plans to make a study of the situation in the early part of 1948. Policies in regard to promotion are still in a development stage since the merger of the two companies.

Pasadena's Municipal Light & Power Department furnishes the range and water heater wiring gratis to its customers, therefore there is no interference with the sale of range. The utility owns, loans and installs the equipment without cost to the user.

Portland General Electric Co. seems satisfied that there is no interference with range sales at an average cost of $45 per installation. Nothing is planned in the matter. No subsidy is provided. Constant promotional and cooperative effort is put forth with architects, electrical and building contractors and others in adequate wiring.

Provo Department of Utilities has a policy of reimbursing the owner $25 on an electric range and $10 on an electric water heater where it constitutes a new load to the lines. Wiring cost is around $40 which still interferes with the range sale. It is felt a program should be inaugurated to curb the unsatisfactory condition. The department advertises adequate wiring direct to home owners.

Public Service Co. of Colorado reports an average range wiring cost of $70 which does interfere with sales. It makes no contribution. The company does have an adequate wiring promotion program which has been in effect for a number of years. During the war for obvious reasons aggressive promotion was stopped until wiring materials became available. The company is participating in home builders shows and in demonstration homes, together with planning institutes. A portion of its regular advertising is devoted to the adequate wiring story. Some wiring installations have been certified recently, and a number of jobs will soon be completed that will also meet certification standards.

The company maintains a special department for contact with architects, builders and electrical contractors. This department, among other things, is aggressively pushing the adequate wiring program. Also a limited amount of help is being received from the financial institutions in recognizing the value of adequate wiring for financial purposes. A regular committee is

Two themes given the strongest emphasis in Washington Water Power Co. advertising have been adequate wiring and a cooperative drive with dealers to sell automatic coal or oil house heating and take the load off electric

functioning under the guidance of the Denver Chapter of the Rocky Mountain Electrical League. This committee is presently planning for further activities.

Public Service Co. of New Mexico reports an average cost of $80 which does interfere and expects to do something, possibly a $30 or $40 subsidy towards the cost. At present it has no promotional program.

Puget Sound Power & Light Co. reports an $80 to $90 range wiring cost which interferes with sales. It makes no contribution towards cost, nor does it have an adequate wiring program.

Riverside City Electric Light Department pays all of the range wiring cost in its territory which amounts to $25.

Sacramento Municipal Utility District quotes an average of $75, which does not appreciably affect sales yet. It is promoting a revised city ordinance and working on a flat rate wiring procedure for its entire territory. It makes no contribution to the cost.

San Diego Gas & Electric Co., in conjunction with the Bureau of Radio and Electrical Appliances, promotes through advertising and direct solicitation, the adequate wiring of homes. Range wiring costs average $60 and have interfered with the sale. The utility contributes nothing toward wiring cost.

Seattle City Light cooperates with the program of the Electric Club of Washington in the promotion of adequate wiring. Average cost of wiring in Seattle is $70 which interferes with range sales. The utility contributes nothing to the cost and foresees no change for the present.

Montana-Dakota Utilities Co. at Sheridan, Wyo., reports a low cost of $30 which has not interfered. The utility contributes nothing to wiring cost.

Sierra-Pacific Power says that the $60 cost in its territory has not particularly interfered with sales. The company contributes $35 towards the installation. It has no adequate wiring promotion program.

Southern California Edison Co. reports that the contractors in some areas have been induced to provide "flat prices" so that the seller or dealer can quote "installed prices." Average costs are $65 and up, which have interfered some with sales. The company does not contribute toward wiring cost, but carries on an extensive wiring promotion program. Twenty-five men are contacting customers, architects and builders. There is continuous advertising and promotion and a fine kitchen planning service. H. C. Rice, manager of domestic sales, says "there is also increasing evidence that many of the contractors and builders are becoming more interested in the hidden values that go into their new houses, namely, electric wiring, to be used as a selling feature in the face of the need for getting larger down payments in the future. Interest rates are also creeping up so that it is going to be necessary to *sell* these houses from now on, and electrical wiring will be a real sales aid."

Southern Colorado Power Co. declares that efforts are being made to stabilize the costs for utility participation on the cost of installation. An average of from $50 to $75 is reported now and interferes with range sales. The company carries on an adequate wiring promotion program under the national committee and through the Rocky Mountain Electrical League.

Southern Nevada Power Co. reports a low range wiring cost of $30 which has not interfered with range sales.

Tacoma City Light says that about 99% or more of all new homes are being wired for electric cooking and water heating. Apparently the cost has not been a factor so far. Average range wiring cost is $65. The utility does not contribute toward it. There is no adequate wiring promotion program either.

Telluride Power Co. at Richfield, Utah, reports the lowest range wiring cost at $20 which has not interfered with range sales. Its adequate wiring promotion consists of newspaper advertising and direct mail to builders.

Utah Power & Light Co., for itself and its subsidiary, *Western Colorado Power*, reports an average of $40 range wiring cost which it thinks has not interfered with sales. The utility does not contribute toward wiring cost. It is tying in completely with the national program of promotion which is implemented through the Intermountain Electrical Assn.

The Washington Water Power Co. reports an average range wiring cost of $70 which is not interfering with sales. It is not subsidizing wiring cost but carries on a very energetic advertising, display, personal contact and lecture program on adequate wiring. It has found sales interfered with to some extent. Corrective educational steps are being taken through the dealer associations to bring wiring costs to a legitimate profit level.

Vallejo Electric Light & Power reports a $65 range wiring cost, which has not seemed to interfere with sales.

Western Public Service Co. at Laramie contributes $25 toward an average cost of $50. This price was recently secured by conference between the company and contractors. Previous wiring costs lost many range sales. The company advertises adequate wiring.

Electric House Heating

During the year 1947 electric house heating, something the industry had worked upon to develop through the past 30 years, suddenly came into great demand. Factors causing this demand included the rising cost of other fuels while electric rates remained stable, the shortages experienced in other fuels, and aroused public interest in such new methods as panel heating, reverse-cycle or heat-pump applications, and a number of new furnaces and other heating.

Ordinarily in the past utilities might have welcomed such new load, but their reserve capacity being diminished to the danger point, electric house heating load was not so welcome.

On this question of whether the individual utilities are accepting or discouraging electric heating for houses, statements such as the following were made in answering the questionnaires:

Aberdeen Public Utility District No. 1 declared its facilities to serve were loaded and it was discouraging heating.

Alameda Bureau of Electricity is accepting electric heating.

B. C. Electric Railway Co. at Vancouver is not accepting such business. There is no provision in its tariff and it is giving point-blank refusal at the present time.

California Electric Power is accepting but not promoting.

Sales training classes were taken to the dealers of the Frazer River Valley by B. C. Electric Railway last year in test courses that will be used in other parts of its system. John Taylor addressed the closing session at Abbotsford; Bill Bitcon is at the left. Our neighbor Canada too has a Western boom

Adequate wiring in Spokane is headed by Paul Heydon, NECA manager and president of the local AW bureau. He presents certificates to builders, C. R. Irwin and G. Hahn, who included AW in their 50-house tract of homes

California Pacific Utilities is accepting heat-pump installations and encouraging them by making test installations.

Central Arizona Light & Power is doing the same. It favors heat-pump apparatus in particular.

Coast Counties Gas & Electric Co. is accepting such business but insisting on engineered layouts and attic insulation.

Eugene Water Board is discouraging electric heating and may increase the rate for users of electric heat. It is considering an increase for use over 1,200 kwh. similar to the Seattle rate.

Frontier Power Co. at Trinidad, Colo., says electric heating is not yet considered in that territory.

Glendale Public Service Department is accepting electric heating.

Idaho Power Co. is discouraging electric heating, with the exception of reverse cycle.

Imperial Irrigation District is accepting it.

Los Angeles Department of Water & Power is accepting but endeavors to control the acceptance by making sure that each prospective user is fully aware of the necessity for insulation, size of the heaters required to produce an efficient installation, and the operating costs that will accrue. This has deterred many from installing electric heat.

Montana Power declares that its market for electric heating is limited due to climatic conditions and the fact that low-price natural gas is available to a large percentage of the company's customers. It is accepting electric heating at one per cent per kilowatt-hour.

Mountain States Power Co. is discouraging it since its power supply is inadequate to enable promotion of load building of any kind.

Pacific Gas and Electric Co. says it is accepting all business.

Pacific Power & Light Co. declares it is unable to serve such load until transformers become available in larger supply.

Portland General Electric Co. says that because of the power situation in the Northwest pool, particularly the lack of peaking capacity, it is discouraging electric house heating and only accepts applications on the basis of service not before April 1, 1948, and only then if conditions at that time will permit taking that kind of business.

Provo Department of Utilities says it is discouraging, because it does not have enough plant capacity and its rates are also too high for general house heating.

Public Service Co. of Colorado says it is not practical in that climate and that natural gas is low in cost.

Public Service Co. of New Mexico says it is discouraging this business because it has no promotional rate.

Puget Sound Power & Light Co. in general is discouraging it and making a study to determine the load characteristics. A study of some 100 house-heating installations is under way. On these metering with special equipment is being done to determine the load characteristics, etc.

Sacramento Municipal Utility District is encouraging auxiliary heating, discouraging complete house heating at present.

Salt River Valley Water Users Assn. on the other hand says that it is accepting the business and says it is a natural growth.

Instead of the utility selling lamps to fill the empty sockets, as in the past, the entire industry was organized by Idaho Power and wholesalers

San Diego Gas & Electric Co. says it is accepting but not promoting electric heating. In fact it discourages the installation unless a satisfactory installation is planned.

Seattle City Light is accepting it to the extent of its ability to serve. Likewise it has instituted a new rate during the past year which increases the cost to one cent per kilowatt-hour after 1,200 kwh. have been consumed in any month. While this rate is being protested by the dealers and electrical heating equipment manufacturers, the likelihood that it will stand increases as the facts of cost of distribution to such load are being developed.

Sierra Pacific Power Co. is discouraging this type of business.

Southern California Edison Co. says it is neutral. It is serving within its ability without rebuilding lines.

Southern Colorado Power Co. is discouraging such business except the heat pump. It declares that electric heating cannot compete with gas in other types of installation.

Tacoma's Department of Utilities also discourages electric heating unless specific transformer check indicates the capacity is available at the pole.

Telluride Power Co. at Richfield, Utah, says the differential in temperature is too great and the installations are discouraged in that area.

Tucson Gas, Electric Light & Power Co. likewise discourages because of deficiency in available capacity.

Utah Power & Light Co. and its subsidiary *Western Colorado Power Co.* are taking no action. UP & L is in the process of installing a test job of heat-pump application.

Washington Water Power says yes and no. "We accept it where distribution permits and customer insists, but discourage it on the basis of customers' cost."

Western Public Service Co., at Laramie, Wyo., however, says it is accepting and soliciting the business.

Lighting Programs

Interest in lighting in all phases of human activity is so great that most utilities report it is more of a problem to take care of the natural demand of the moment than it is to promote any lighting uses. This may be said to be living off of the fat and will run out someday soon. Shortage of generating capacity to serve increased loads, especially at the peak periods, such as most lighting requires, is a dominant influence in the policies of the sales departments of most Western utilities. However, many are preparing for another day in which lighting will have to be sold and the public educated to its values. Meanwhile the efforts of the lighting people in the utility business are being devoted to advising people how best to use the lighting that they are demanding.

Since the entire industry has got together on a "Planned Lighing Program" in all fields of lighting, this program is being used by many as the basic one from which to handle the lighting business that is accruing.

Specific statements from the Western power companies who are doing something in lighting are to be found in the following:

British Columbia Electric Railway will use the planned lighting program

first in schools, followed by commercial and industrial.

California Electric Power says it is following the planned lighting program of Edison Electric Institute.

Central Arizona Light & Power makes customer calls and is considering the use of EEI mailing pieces.

Coast Counties Gas & Electric Co. likewise is continuing planned layouts and uses the EEI promotion materials.

Idaho Power Co. will use the PL/PL lighting program.

Los Angeles Department of Water & Power says that the accent will be on commercial lighting, primarily the modernization of those stores which, due to lack of materials, etc., have not had an opportunity to improve their lighting. Indications seem to point to the fact that this will be a very active market for lighting promotions because competition in most merchandising lines will be very keen, and lighting will be used as a merchandising medium. With a steady influx of industry into the territory there will be considerable opportunity for the development of industrial load. The promotion of school lighting is facilitated by the fact that the city of Los Angeles school system is a single unit coming under the jurisdiction of the Los Angeles Board of Education. Those in charge of illumination in the Board of Education have confidence in the department's lighting engineering staff and come to it regularly for advice, says Charles C. Snyder, business agent of the power system.

Montana Power Co. has an advisory service to architects, builders and customers.

Mountain States Power Co. gives assistance to customers and lighting dealers in that field.

Pacific Gas and Electric Co. works with architects and engineers to render advisory service for customers and contractors in connection with providing installation that will meet established lighting standards. It cooperates with all branches of the electrical industry for the purpose of programming educational courses relating to illuminating engineering techniques.

The Pacific Power & Light Co. program is under process of being developed.

Portland General Electric Co. has no special promotional activities planned for 1948 although it maintains an advisory service.

Public Service Co. of Colorado makes personal contacts in all three fields of lighting. It provides engineering layouts on request. School relighting is now in process for 500 rooms in Denver schools. Some of the EEI literature will be used in 1948 and talks given at every opportunity in schools, etc. of lighting. This will continue throughout the year.

Puget Sound Power & Light Co. has men available in the lighting field for advice and consultation on customers' lighting problems. Help is particularly given to schools, in cooperation with the various school organizations, to improve lighting conditions. These men are also assisting the cities in planning of street lighting, but no definite promotion is contemplated. The company will tie in with the planned lighting program but on a reduced scale.

Sacramento Municipal Utility District will carry on a school lighting campaign of letters followed by personal calls when the planned lighting program mailing pieces arrive.

A trend toward more electric pumping is to be noted in the Walla Walla region, served by Pacific Power & Light Co., as wells tap underground water tables along the bench lands high above the river valley itself

San Diego Gas & Electric Co. will increase its efforts in improving commercial, industrial and school lighting by adding more lighting engineers.

Seattle City Light has no major activity but continues its present advisory service.

Sierra Pacific Power Co. cooperates with architects, builders, and contractors.

Southern California Edison Co. will increase its present 30-man staff by two men and back them up with extensive advertising.

Southern Colorado Power Co. will tie in with the planned lighting campaign.

Utah Power & Light Co. will make a complete tie in with the national planned lighting program.

Washington Water Power Co. says it will do little active general promotion but continue to render customer service.

Western Public Service Co. will carry on promotion by lighting salesmen.

Agricultural Programs

Electrification of the farm is fostered largely by the power companies serving rural areas and the REA's and public utility districts. Municipal utilities as a rule serve very few if any rural customers.

British Columbia Railway Co. has an over-all program promoting the development of the agricultural industry. The specific load-building duties include the promotion of adequate farm wiring, recommendations on use of farm electrical equipment, assisting in cooperative tests on new uses of electricity on the farm with the dominion-provincial agricultural departments, the University of British Columbia, manufacturers and distributors of equipment. There is also active participation in agricultural organizations throughout the rural territory.

California Electric Power Co. offers its rural customers engineering service, pump testing and other assistance in connection with agricultural problems.

California Pacific Utilities Co. says it is adding rural customers to the limit of the availability of labor and materials.

Central Arizona Light & Power Co. considers irrigation pumping as industrial load and expects sizable increases in irrigation pumping during 1948. It makes no mention of a specific agricultural development program.

Coast Counties Gas & Electric Co. continues to have a full-time agricultural specialist.

Idaho Power Co. plans promotions on milk cooling, will cooperate in the 4-H program, will promote farm electrification in every respect using community tie-ins and day-by-day promotion.

Montana Power Co. says it is developing all phases of farm electrification.

Mountain States Power Co. has no specific plans because the power supply in the Northwest is so limited.

When PG & E ran new rural extensions to the foothill regions of San Joaquin Valley, new customers were told of adequate wiring, appliances, farm electric equipment in schoolhouse meetings attended by all from miles around

Pacific Gas and Electric Co. anticipates a peak demand for agricultural electrical service during 1948, principally caused by the continuing favorable prices of agricultural products. During 1948, says O. R. Doerr, general sales manager, the PG and E Co. will construct about 4,000 miles of electric distribution lines into unserved electric area, which will make electric service available to practically all the farms located in the territory. Pump testing service will be continued and the area water table studies will be developed for the benefit of all farm customers.

Portland General Electric Co. will do considerable 4-H club work and make contacts with county agents and others.

Public Service Co. of Colorado will have a program that includes continual work towards the objective of providing electric service to 95% of all rural residences in the service area. According to G. B. Buck, vice-president, "we will continue to develop ways and means effectively to aid the farm customer to utilize profitably the electric power purchased. This will include cooperation with agricultural, educational, and extension agencies, and promotion work with farm electric dealers."

Public Service Co. of New Mexico is likewise seeking to electrify additional farms.

Puget Sound Power & Light Co. will continue its program of the past several years, assisting rural customers with utilization problems, and conduct its laboratory for the development of new farm uses for electricity. It contemplates very little promotion however.

San Diego Gas & Electric Co. expects to continue its present plan of liberalized extensions in the rural territory and to continue to keep a large number of rural salesmen active in selling, according to A. E. Holloway, vice-president in charge of sales.

Sierra Pacific Power Co. will do advertising with dealers to promote agricultural uses.

Southern California Edison plans to establish one or two pump test crews and to cooperate with the extension service and with the CREA.

Southern Colorado Power Co. will utilize the "Go-All Electric" campaign, which is being set-up by the Rocky Mountain Electrical League and NEMA.

Sacramento Municipal Utility District says its limited system capacity makes promotional load building impractical but it will continue pump testing and advisory service.

Utah Power & Light Co. will continue its demonstrations and displays at county fairs and pay particular attention to rural extensions.

Washington Water Power Co. will aid in the promotion of 4-H clubs, electric clubs, and give close cooperation with college farm extension service.

Industrial Development

A long-range view is usually taken by most of the utilities in the planning of generating capacity and facilities to serve. Likewise most of them have a long-range view in regard to the industrial and commercial development of the territories which they serve. For new industries and expanded business all reflect in increased kilowatt-hour use. They bring population which in turn creates more users of electricity and makes a market for more appliances and services. Many of the companies have men assigned definitely to this work of developing the community's business interests. They work with Chambers of Commerce, business organizations, state and local officials, planning boards etc., and render a variety of useful services which in turn bring data and information of value for the future planning of business. Many do national advertising to interest eastern manufacturers to locate plants in their areas.

An interesting sidelight to the coming of age of the West is that a number of eastern communities are doing the same thing with Western manufacturers. They are seeking to interest them in establishing branch eastern plants. It is as though the West could say, "now I am a man" industrially.

Some details of these industrial-development programs are contained in the statements from those utilities which reported as follows:

Alameda's Bureau of Electricity is working with the Chamber of Commerce in its efforts to bring industries to that city.

B. C. Electric Railway Co. will continue on a reduced scale the national advertising campaign to attract new industries to British Columbia. The company is encouraging the establishment of industries in the territory by this campaign using as a slogan, "Business is Moving to B. C." It is also assisting industries in their development through the Research Advisory Service, it supplies information regarding raw materials available in the region as well as technical information in connection with manufacturing methods. The character of power load has changed only in that the company is getting larger single loads, whereas formerly it was called upon to serve small units. 1947 has been a year of expansion and development, says M. C. Trueman, sales manager of the Victoria division. A match factory and a felt and textile plant have been established as well as an increase in capacity of several existing plants. It is quite likely that woodworking will show considerable activity in the coming year with several new factories opening up.

California Electric Power by close contact with representatives in the field will aid in all industrial development

House of Modern Magic show, staged by Public Service Co. of Colorado men, Gus Lindeman and Theo Berri (and others not shown), for electrical dealers, contractors, architects and builders and from which an electronics course was started in cooperation with the Rocky Mountain Chapter of the NECA

possible. Branch factories are beginning to be located in the territory which may bring some changes in load.

California Oregon Power Co. through its energetic vice-president, Glenn Jackson, is acutely conscious of the need to bring industrial development to the Medford Valley in Oregon. Lumber processing and industries to utilize the agricultural products of the region are being sought.

California Pacific Utilities Co., serving a number of smaller communities in Oregon, Washington, California, and Nevada, finds itself limited in industrial development by the long delivery dates on substation power transformers. Says E. A. Nickelsen, commercial manager, "development of industrial loads has been somewhat limited by the extremely long delivery dates quoted on new substation power transformers. Very few of such transformers are available from the used equipment dealers and all War Assets Administration equipment of this type has also been absorbed. Substations in many areas are carrying full load and the maintenance of good service depends upon the early delivery of new substation transformers and other equipment, much of which has been on order for more than a year. Installation of a large number of distribution-system capacitors has been the source of additional capacity on many substations."

Central Arizona Light & Power Co. expects sizable increases in irrigation pumping during 1948.

Eugene Water Board declares that its power load continues to grow. Harold H. King, assistant secretary, declares that shortage of power may hinder some new industries, according to the local Chamber of Commerce.

Idaho Power Co. A very astute industrial development program has been going on for many years in the Idaho Power Co. territory. Of it E. A. Olsen, sales manager, has this to say:

"The industrial development program of the Idaho Power Co. has as its aim the building up of the income in the communities it serves through industrial expansion. This expansion will be in the fields of the further processing of raw materials available in the adjacent areas. These raw materials include agricultural products, forests and minerals. In many cases these products are, at present, shipped elsewhere for further processing. In other instances, such as in mineral deposits, it is necessary to start exploration operations and then determine the feasibility of the local refinement of the raw minerals.

"To secure the interest of local as well as outside capital in the raw materials of the area, it is first necessary to know what the area has to offer and the quantities in which its raw materials are available. This must be supplemented by a knowledge of the extent of existing industries and local conditions of labor, climate, utilities, markets, etc.

"A realization of the necessity for having these facts plus the knowledge that these facts are not available, has led the Idaho Power Co. to lend its support to securing a survey of its communities, its present industries and a tabulation of facts upon which the potentialities of the community may be predicted. This broad survey is conducted by the industrial development department of the Idaho Power Co. in cooperation with the chambers of commerce in their respective communities. This survey of facts is then indexed and given to the chamber of commerce. As future production figures are available or new enterprises develop, this information is added to the file. In this manner the industrial survey becomes not only a tool of present value, but a basis for future industrial promotion due to its planned continuity.

"The industrial survey information is limited in its value if only used to supply requests from interested organizations. Therefore, the Idaho Power Co. industrial development plans provide for assisting the communities in the preparation and distribution of attractive brochures suitable for wide distribution to industrial organizations. These brochures act as the "show window" for their respective communities, inviting further inquiries into their various resources and industrial opportunities of the area. To date, five such brochures have been prepared and six more are in various other stages of production.

"It is difficult to state definitely the results of such a broad advertising plan. A number of food processing industries have opened plants. Assistance has been given also to mineral processing plants and a great deal of data and information supplied in response to numerous miscellaneous inquiries. An example of this is in the recently announced phosphate fertilizer plants for eastern Idaho, utilizing Idaho phosphates by the electric furnace method for the production of fertilizers and other phosphorous preparations. The Idaho Power Co. industrial development plans call for not only the supplying of preliminary and detailed information to inquiries but also the rendering of engineering and technical assistance in the actual establishment of plants and factories."

Los Angeles Department of Water & Power, according to Charles C. Snyder, business agent, renders assistance to present local industries by facilitating machine tool exchange, exploiting availability of machine tool time and other productive capabilities, fostering local subcontracting and supplying locally needed parts and materials, suggesting market opportunities and product ideas, recommending improved production methods, particularly electrical. Likewise it encourages manufacturers to

locate new plants in the area by direct nation-wide solicitation, market surveys, cataloging available floor space and sites, direct mail, and publication and distribution of industrial brochures, exhibiting in national industrial shows, and cooperating with chambers of commerce and other agencies.

The rapid expansion in industrial loads has increased the ratio of the system morning peak to the evening peak. Larger power loads have resulted in transferring loads from the 4,800-volt feeders to the 34.5-kv. system. The increase in power loads and larger loads per customer have combined to decrease the average rate.

Montana Power Co. is cooperating with dealers in industrial equipment in all of the towns served.

Mountain States Power Co., because its power supply is limited, has no program of this kind.

Pacific Gas and Electric Co. will cooperate with all civic organizations, banks, realtors, and chambers of commerce interested in establishing industries in northern and central California.

Pacific Power & Light Co. is in the process of correlating both the Northwestern Electric Co. and its own former Pacific Power & Light Co. system and developing its policies for the new year.

Portland General Electric Co., although it has no specific program, has been available to advise customers on their electric power needs. It notes significant change in the character of industrial power business since the war in that it now has more diversified industrial customers than previously.

Public Service Co. of Colorado has a program of cooperation with local chambers of commerce. Assistance to the smaller cities has been rendered by the preparation and printing, in the form suitable for mailing, of an industrial survey containing basic facts about the city and the area. In addition, assistance has been rendered to the governor's council for resources development in the establishment of that council on a state-wide basis. The main purposes of this council are an orderly development and utilization of the state's economic resources, in order to realize better living in a more prosperous economy. Power load in the area has not made any significant changes in character of the business. During the next five-year period, G. B. Buck, vice-president, feels, the percentage of power load sold to transportation services will increase because of the shutting down of an isolated plant serving the Denver transportation system.

In one of its spectacular series of community building ads, Hawaiian Electric told of industrial additions to the "storehouse of Honolulu" during 1947

Public Service Co. of New Mexico like other companies is trying to interest factories to locate in its area. This is particularly true of Deming, N. M., according to Ben Fields, office manager.

Puget Sound Power & Light Co., through the Research Advisory Service and continuing with its group action plan, is carrying on a consistent industrial development program begun several years ago. There has been practically no change in the character of its power business. Actually, says Pat Johnson, vice-president, "we took on very little business that could be called only wartime business. Of course practically every industry we had was engaged in war work with stepped-up activities. These plants are now, for the most part, operating on peacetime production and many of the smaller plants have expanded."

Sacramento Municipal Utility District says its limited system capacity makes industrial development impractical at the present time. It is rendering advisory service and assisting customers to make efficient use of new electrical methods.

San Diego Gas & Electric Co., which had a national advertising program during last year, has decided not to continue it in 1948. Its irrigation business, due to rural electrification, has grown. The aviation industry, which had a slump following the war, has picked up again. Also, there is more construction business since building has increased.

Seattle City Light is curtailing its activities due to power shortage and foresees no major expansion in the near future. Over 100,000 kw. of war production load is now converted to civilian production. Basic industries are expanding and erecting new plants to meet the growing demands of the postwar era.

Southern California Edison Co. has a program in cooperation with local chambers of commerce. It publishes industrial surveys of the territories which it serves. Its power load is growing toward the industrial side and this change should continue.

Southern Colorado Power Co. likewise is working with chambers of commerce in their plans for local development. Its power load remains about the same as during the war. It will connect several new plants during the year, such as feldspar, cement, metals industries, ice plants etc.

Tacoma City Light follows up load inquiries as conditions permit, but has no other program.

Utah Power & Light Co., while it has no definite activity under this name, does considerable work along these lines in the course of advising industries on their power needs.

Washington Water Power Co. has no special sales promotion but renders engineering and general information service. A good deal of the attention of the industrial sales personnel has been devoted to studying and assisting local industries to shift portions of their power requirements off the peak hours in order to release more capacity to take care of increased community growth.

Western Public Service Co. of Laramie, Wyo., works with the Chamber of Commerce on development of industries.

● LLOYD SUTTON has opened an office in the Western Merchandise Mart, San Francisco, where he will serve as representative in northern California and Nevada for the Freed Radio Corp. Sutton is also a representative for the A. C. Sanger Co., New York City. He was formerly with the Frank Edwards Co. of San Francisco, where he served as manager of the appliance division.

● J. D. CRAWFORD is the new regional sales manager of the Pacific Northwest region for Crosley Division, the Avco Mfg. Corp. He will handle the states of Washington, Idaho, Utah, Montana, Oregon and parts of Wyoming and Nevada, as well as Alaska.

● J. C. HALL has been named sales representative in British Columbia and Alberta for the Sunbeam Corp., with headquarters at Vancouver. He was formerly with MacKenzie, White & Dunsmuir Ltd. at Vancouver, B. C.

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © February, 1948

In Hot Water Again

WHEN selling **electric** water heating, sell the difference, the plus or exclusive features of **safe, clean** and **carefree** electric automatic water heaters. Make these exclusives, these differences stack up high against other ways to heat water.

What are these differences, these extra benefits? Briefly said, here they are—

Carefree—With an electric water heater there is nothing to turn on or off but the faucet . . . No pilot to worry about . . . Once installed you can forget it . . . Water always hot, yet won't overheat . . . Even if not used, water will remain hot for three days or more . . . Can leave the house with the children there alone and mind can be at ease . . . There are no switches or valves for curious little ones to touch.

Clean—Clean as electric light and sunshine. Cleanest fuel on earth . . . ashes soot, oder, fumes, smoke —all are eliminated. Clean air means less cleaning of wall paper and paint, less housework . . . Means clean air to breathe too . . . Water heater itself is easy to keep clean too.

Safe—Does away with open flames . . . the possibility of leaky pipes or faulty flues . . . Approved by Underwriters', it's a better investment than fire insurance because it gives daily dividends . . . The water never gets dangerously hot.

Healthful—Dependable hot water makes cleanliness easy . . . Bathing is convenient, pleasant . . . Hot water is indispensable in time of illness . . . It is a beauty aid, too.

Always Ready—Day or night there is hot water . . . No tank patting or waiting . . . Requires no attention at all.

Cool in Summer—Like a big thermos bottle, all the heat is sealed in, where you want it to be . . . The tank is moisture, vermin, rot proof . . . It is cool to the touch. It can be installed anywhere.

Quiet—No moving parts, no roar, cannot generate steam to pound the pipes.

Install anywhere—Economies can be made by installing it nearer the point of use . . . Requires no flue or air supply . . . Heating units give years of uninterrupted service and the thermostats are simple and positive as well as accurate. Monel or bronze or glass-lined tanks give about 20 years of service as against the short life of fuel-heated tanks.

Efficient and economical—Water heating rates are low . . . Heat is 100% utilized, none of it goes up the chimney . . . No fuel is wasted in incomplete combustion . . . Installed near point of use saves heat loss in long pipe runs . . . Remains efficient throughout a long life.

Improves property value—Homes with the modern electric equipment have the best resale value . . . Safest way to heat water reduces insurance risk . . . Longer life of equipment adds value to house.

With such **exclusives** it should be easy to sell electric water heaters to anyone. Go to it!

Be Financially Successful

by

SALES TRAINING

Sixth of a series by

KEN HAMPTON

THERE is no function in the business world that puts a greater value on personal performance than salesmanship.

Salesmanship is the spark plug of retailing. In some form it is the secret of all success in retailing.

It is the reason that 75% of the retail volume on any appliance or group of electrical merchandise is accomplished by 35% of the retail stores selling that merchandise.

Similarly, sales managers' studies have shown time and again that about 25% of any group of salesmen accomplish 75% of the total sales for the group. Here again it is the best trained men who sell the most merchandise.

And experience in retail merchandising teaches that salesmen are **trained** to success, not **born** to it.

I have just reviewed some very interesting interviews that were held with leading retail salesmen in all parts of our nation. To a man they named **training** as either the No. 1 or No. 2 reason for their successful careers. All of them said they are constantly continuing to learn the art of selling . . .

All that has been said here you will probably agree to and add that the war years certainly showed up the untrained substitutes for retail sales clerks we had to use in our stores. These war years also showed how once good sales people can slip and grow inexpert when they do not keep alert by **retraining** and refreshing themselves in their sales methods and techniques.

They were not only awful, but the public still resents their crudeness—another way of saying their lack of training.

As a dealer it is important that you have good salesmen and saleswomen in your store today. People who not only can tell the story of the product, but people who represent **you** correctly to your customers. People who can and will carry out your policies.

This means trained people. They aren't for hire in the market today but they can be trained—

Trained by you—

Trained by the manufacturers and wholesale distributors men who call on you—

Trained by the sales department personnel of your utility office—

Trained by correspondence courses you or they can buy—

Trained from books that may either be purchased or that may be borrowed from the local library.

Or trained in group meetings organized by you and other retailers in your community.

Trained salesmanship means a profitable volume to your store. It means satisfied customers who will remember to buy from you again and send their friends to patronize you.

Why not start training the people you now have—now. And if yours is a small business and you are your own salesman, isn't it all the more important to you to learn to sell more easily and successfully?

To Salesmen Only—

Did you ever watch a magician? Didn't you marvel at his trained dexterity?

The sales training manager of one of the big electric manufacturing companies believes in that kind of magic. He believes that every word, every act or gesture of a champion salesman before a customer should be carefully and expertly made and timed as the movements of a magician.

Whether you agree with him or not you must agree that training is magic for a salesman.

It increases his sales.

It helps him to make friends and please customers.

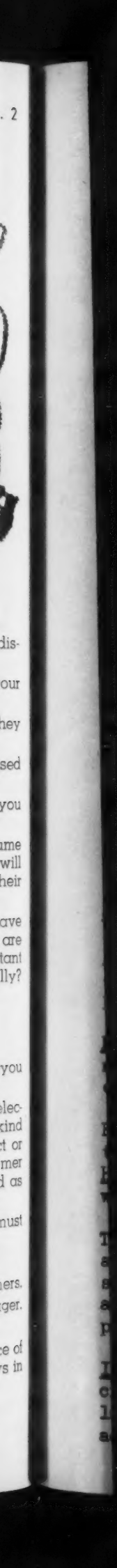
It gains for him the approval of his sales manager.

It increases his earnings.

Training is the magic way to tap the experience of sales experts. Through training a salesman grows in knowledge and earnings.

Training is gold to salesmen.

It is worth a lot of "digging" to acquire it.



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ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

February 1948

If midwesterners look to see whether the groundhog casts his shadow to predict the spring, Western appliance people look to Market Week in San Francisco and to the Spring Conference of San Diego Bureau of Radio & Electrical Appliances for signs of what to expect in forthcoming months. The big Chicago market was almost frozen--at least those who went to see housewares in "the barn" were; the Los Angeles market is not yet an appliance market. Furniture buying was reported slow at both, due to dealer inventories and high prices. Quality of merchandise was an improvement.

Shadow casters

But in appliances, the Western oracles are the S.F. Mart, and San Diego's whiz-bang one-day conference, which pulls the news from the manufacturers in quick talks. The conference, Jan. 29, registered more than 500, had big shots Ed Hurley of Thor, Art Scaife of General Electric and Bill Jack, founder of Jack & Heinz, besides a host of western managers of national concerns and western manufacturers in person.

Talent parade

Sunbeam's Charlie Moore said Mixmaster attachments will become available again in '48. Also said Mixmaster production is 176% of 1941, Ironmaster 217%, coffee maker 171%, Shavemaster 271% but Wafflemaster only 17%. Allocations on a fair basis are the distributors' biggest problem.

Attachments again

Ray Hahn said Maytag is still on allocation despite two million machines in '46 and '47, and the five millionth Maytag was turned out just recently

Allocate

Bad news was that the big fire General Mills had recently destroyed the plant making the clever new steam iron attachment for its Tru-Heet irons, and will delay deliveries for 90 days. Irons themselves will not be hurt.

Fire delay

The Eastern cold wave, declared Frank Ballman of Thermador, has put a big strain on supplies of electric portable heaters but they are still rolling out. The conventional type range will be short for awhile, but the new built-in models are being delivered fast. No price increases in sight.

East demand

Ironrite's 1948 model is out, without price increase and the increased production should hit the coast by March. Ironrite has 100 girls trained as demonstrators to aid dealers cash in on ironers, according to Chan Keeney.

By March

Mike Dugener announced that Little Giant tray washer is now set up for distribution in all parts of the 11 Western states. | All over

Proctor's saturation selling test on irons in San Diego resulted in 50% of all participating dealers' sales being Proctor. 75% of dealers said it increased sales, most effective promotion proved newspaper ads, demonstrations and window displays, in that order. Proctor is field testing an electric blanket and will have a coffee maker soon, said Jack Booth. Its line of toasters won't be in sufficient supply until 1949. Both Proctor irons and toasters will be on allocation during the first quarter of 1948. | Test results

Monitor distributor Ralph Wilford predicted five times as much Monitor production in 1948 as in 1947; 500,000 baby washers, refrigerators with good deliveries and an automatic clothes washer by fall. | Stepped up

Ben Davis told what Handyhot's policy was—to sell only through distributors, all fair traded, but all at prices a third less than the regular level. Handyhot makes a wide range of table appliances, etc. | Policy

Dick Tupper of Thor, announced that their new complete sink unit would be out about March, to sell at $389.50. Ed Hurley, Thor's big boss, talked his plain talk to the dealers, urging them to use the users more, go back and see them and get prospects from them. | Follow up

Ray Cox of Herbert Horne, Admiral distributor, said that company would spend $2 million in advertising in 1948, more than the 1940 gross. Will have a new freezer in April or May; has a clever ensemble idea (which Harold Conklin displayed at the Kaemper-Barrett space at the S.F. Mart) of a console radio, to which a matched unit of television and matched record cabinets can be added later. Also has a table video set at $175. | Ensemble idea

Nick Dinkle of Crosley stressed the need to keep on demonstrating radio to keep selling consoles. Ben Sanderson of Deepfreeze urged using the high cost of food as the best sales argument to sell freezers, saying 84% of foods can be frozen, 20 to 80% of food bill can be saved, average family can save $12.50 a month, enough to pay for it. Pete Sues of Sues, Young & Brown, Coolerator distributors, told how the latter has bought Gibson, but both makes will be distributed separately under their own names. Art Scaife, General Electric, gave an inspirational talk about people that left many a good sales idea, (see next month's Electrical West). Klaus Lansberg, KTLA television station expert, left encouraging word that all national television programs will cover the coast within two years, that relay stations will bring programs ahead of the coaxial cable job. Said installation costs are too high. Fred Fenton of Easy, wound up the meeting in his Easy way. | What was said

San Francisco's Market started slow on a freak cold and rain storm, but built up attendance all week. Furniture and giftware buying was cautious. Appliance interest, since franchises are saturated, centered in new things shown. Most lines showed detail refinements, some styling changes. Next issue of Electrical West will picture many of these. The following, an incomplete list, excited a lot of interest. | Market builds up

Ansley Radio's new blonde wood electronic piano, with built-in radio and record player—piano can be used silent for practice, without amplification like a harpsichord, or amplified like a concert grand—to sell at $1,375. . . Apex new Fold-a-Matic ironer that fits into a neat counter unit cabinet to go in with kitchen cabinets. . . Admiral's ensemble radio console and television matched unit. . . Kelvinator and Leonard full door refrigerators, and Kelvinator's new | New things seen

range with lift-up cooker well unit and controls on the back splasher. . . Fowler's little Jiffy Jr. 5-gal., 110-v. water heater for a number of special sales. . . The return of Nesco's popular prewar casserole, which makes "Gordo Lopez" beans deluxe. . . Samples of General Mills' clever steam attachment to go with its Tru-Heet Irons . . . Philco's new low-priced television table models. . . Westinghouse's long promised automatic clothes dryer to match its Laundromat, also its new line of water heaters, and the first demonstration of its high powered new mixer which will reach the West later in the year. . . Easy Washer's new water rinse center post in its new spinners.

Ask their help

National Electrical Retailers Assn. held a big leadership conference at the Chicago market, Denver's dynamic Herb Names, presiding. Presented 30 representatives of national manufacturers constructive suggestions on franchising, discount selling, builder purchase sales, tie-in sales, price cuts and model protection, fair trade prices, ad helps, descriptive tags, discounts, grey market, sales promotion, trade-ins, dealer responsibilities, rural markets, service and installation problems. NERA bulletins give all the details. Conference produced much good.

Too slow

Kaiser dishwashers will be distributed by a Kaiser organization instead of through distributors. Weren't moving fast enough to suit Kaiser.

Heater sales hot

Hotpoint has come up with these percentages tabulated from a recent survey they conducted on refrigerators and freezers. . . 65% of the appliance dealers think consumers would buy a combination type refrigeration-freezer in preference to a standard refrigerator, although the combination type is almost unknown. . . About 50% of the dealers believe that the sale of combination refrigerators will lead to the sale of a separate home freezer. The survey indicates that a two-door model, with the top compartment for the freezing and storage of frozen foods, and bottom a conventional refrigerator, will find the greatest market.

Put out by the National Electrical Mfgrs. Assn. and the Edison Electric Institute is the electrical living symbol pictured at the right.

NEMA announces that this year's advertising for the electric range section is being addressed to builders and architects and will be expanded in the same publications as in 1947. The educational campaign will include a full schedule of advertisements in school management. . . "Cooking Electrically," NEMA's electric range consumer booklet offered on the market a short time ago, has been reprinted and is available now at reduced cost.

At the same time NEMA tells of its advertising plans for the electric water heater section. An expanded program for 1948 will devote four times as much space to selling builders and architects than during 1947. . . "The Modern Automatic Electric Water Heater," NEMA's recent booklet, tells the story of hot water heated electrically, illustrated with pictures, charts and diagrams.

Resume meetings

Sylvania Electric is under way again with its technical meetings for radio servicemen. Under the direction of James H. Canning of the Emporium Engineering Staff, 40 meetings have already been held in 18 states.

All dealers who have home economists should send them to the Home Economics Workshop sponsored by the Home Economists Committee of the PCEA, headed by Marguerite Fenner. The two-day program will be held on Feb. 19th and 20th in the May Company auditorium in Los Angeles. Some of the scheduled speakers include, Mrs. Margaret Deeter and Mrs. Evelyn Conant of the Southern California Edison Co., demonstrating the home economist calling on a new user; Miss Lois Ferris, Western director of the Home Economics Institute, Westinghouse Electric Corp., presenting the automatic washer; and Miss Mary Louise Parks, home service director for the Leo J. Meyberg Co., San Francisco, demonstrating the rotary ironer.

Women at Workshop

Leonard Division of Nash-Kelvinator announces important features of its new line of refrigerators. . . refrigerated storage space throughout the entire length of cabinet. . . built-in frozen food chest. . . full length doors. . . refrigerated fruit freshener.

Like its mate

Reports from Seattle indicate that appliance and radio distributors will have an important spot in the Seattle Home Show, sponsored by the Seattle Post Intelligencer and Seattle Master Builders. The show is scheduled for March 27 to April 4, 1948.

Seattle show

"High Lines," a new publication put out by the Sacramento Municipal Utility District will be issued monthly to bring news to the dealer regarding the utility. First issue explains the utility's appliance service policy, range and water heater registration plan, dealer participation list, and its dealer prospects allocation plan.

Monthly news

First showing of a new 24-inch window ventilator was made at the recent Chicago Home Furnishings Market by the V. E. Sprouse Co. Inc. Ventilator is slipped into a window frame, adjusted to fit the frame, and plugged into any convenient outlet. Unit has a protective grill over the front.

Fresh air

New manual put out by the Edison Electric Institute outlines a suggested method for selecting and placing salesmen. Entitled "A Guide for the Selection of Sales Personnel." Price is 75¢.

How to choose

Special news from the Southern California Radio & Electrical Appliance Assn. is its announcement by William J. Quinn, managing director, of an "All-Electrical Show" August 20 through 29, 1948, at the Pan-Pacific auditorium in Los Angeles. In cooperation with the electrical industry the association plans to show the latest in radios, electrical appliances, FM, and television. F. J. Tabery of the Tabery Corp., will be managing director of the show. Space is being reserved now.

Electric show

This year the Construction Industries Home and Building Exposition of southern California will concentrate more than ever before on actual construction process, materials, appliances and projects, says Milton J. Brock, president of the exposition. Dates for the show are June 10-20, 1948 at the Pan-Pacific auditorium in Los Angeles. Home appliances will have their place in the show in the exhibit of the NECA, with new applications of convenience and safety and demonstrations of what can be done with electrical installations. 67% of the space is already reserved indicating an early sellout.

Emphasis on construction trade

More than 125,000 water heaters of all types were sold to Southern California Edison Company customers in 1947, says H. C. Rice, company manager of domestic sales, adding that 60,000 of the total were installed in new buildings. The company's water heater promotion in May 1947, resulting in a 50% increase in water heater sales in the Edison territory, warrants additional advertising, Rice pointed out. Company plans to run ads in 175 daily and weekly newspapers in the Edison territory.

Heater sales hot

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Seattle Assn. Indicated

In the second of what contractors charge is a politically inspired drive, the Seattle Electrical Contractors Assn. and its members, officers, etc., have been indicted for alleged violation of the Sherman Anti-trust act, the Kansas City Chapter, NECA, being the first. Investigators for the Department of Justice also have been prowling and trying to build up cases in Sacramento, San Francisco, Los Angeles. Electrical contractors and electrical manufacturers, so far, seem to be the target, for a group of electrical manufacturers in Los Angeles were also indicted.

In an open telegram to Tom Clark, U. S. attorney general, Russ Horning, manager of the Seattle NECA chapter, charges that Investigator McHugh went before the grand jury with false documentary evidence, supplemented with three additional charges taken out of an old NRA Code, that members have not used for ten years.

Charges against the five corporations, 12 individuals and the association are that they arbitrarily set prices, operated a bid depository and used a uniform method for calculating job costs. Kansas City chapter was charged with agreeing to include an escalator clause in all contracts and of agreeing on a uniform markup on completing the installation of prefabricated houses on which they did not supply materials.

Investigators have admitted to association managers interviewed that they are not permitted to inquire into any acts or activities of the unions.

● E. R. CORNISH, former Oakland estimator and contractor and one of the founders of the East Bay Estimators Club, has been appointed field representative for the National Electrical Contractors Assn., Division 6, comprising the states west of the Rockies. He succeeds C. Fenton Ford. Cornish will take a training period with George Seaman, field representative for Division 5, who was formerly supervisor of field staff, and then return to the West about March.

● FIRST CONVENTION of the recently formed Idaho State Electrical Contractors Assn. will be held at Hotel Boise, in Boise, Feb. 16-17. Some 200 contractors from all parts of that state are expected, according to W. A. Hopper, Gem State Electrical Co., Boise, president. One of the main topics will be Idaho's state code. Committee handling the convention details consists of W. R. Reed, general chairman; A. E. Anderson, registration, finance and exhibits; H. F. Koch, program; P. H. Forte, hotel, reception and banquet; Maynard Smith, hotel reservations.

● FRESNO'S A. S. HENDERSON, proprietor of Hendee Electric Shop, and chairman of the Fresno branch, was elected president of the Northern California Chapter, NECA, at the annual meeting of the board of directors, in Oakland, Jan. 23. C. D. Bronson, California Electric Co., whom he succeeded, was named chapter governor. Cecil Searle, Santa Cruz Electric Co., was elected vice-president and W. A. Cyr, honorary member, reelected treasurer. R. V. Carey, manager and Ernest Kramm, assistant manager, were commended for a year of successful operation and a balanced budget.

San Francisco Harmony

W. B. Baker, industrial electrical contractor, San Francisco, and a compromise harmony slate of officers, were elected unanimously by the San Francisco Electrical Contractors Assn., Inc., at its Jan. 29 meeting, and even the "$64 question" of NECA affiliation was settled by a majority vote to change the name of the organization to San Francisco Chapter, NECA. Baker recommended a program of remodeling the association offices.

With Baker as president, also elected were Victor Lamoge, vice-president; E. W. Scott, secretary; E. F. Dowd, re-elected treasurer; and for directors, E. Roy Moser, H. C. Reid, P. J. Furlong, Roy Cooke, W. T. Kennedy, K. M. Ryals and F. W. Schultz.

Tom Harris, president for the past two years, had been inactive due to his health for most of the year, and Ed Conroy, vice-president, had been acting president. Conroy too suffered ill health and withdrew from the contest for president, but remains the chapter governor for NECA.

● WILLIAM BASSETT, Conrad Electric Co., Oakland, was elected chairman of the Alameda County branch of Northern California Chapter, NECA, at its Dec. 16 annual meeting, in Oakland. Art Sousa, Broadmoor Electric, was named vice-chairman; J. R. Havens, Havens & Wade, secretary and on the board of the chapter, representing the branch, Ed Buttner, Scott-Buttner Electric; Dan Bronson; B. A. Solomon, Del Monte Electric; A. L. Saraphin, Hayward Electric; B. C. White, White Electric, Berkeley; John Branst, Niles Electric, and Russell Grosjean, Area Electric, alternate.

● MARIN ELECTRICAL CONTRACTORS Assn. held its annual banquet, Dec. 12, at Maison Marin, near Novato, Calif. Jack Cimino, presided as president of the group. Banquet arrangements were in charge of G. M. Hyams.

● ELECTRICIANS are reported to be on strike in Eugene, Ore., where bargaining procedures broke down Jan. 1 and no agreement had been reached late in the month.

Idaho Inspectors

Idaho chapter of International Assn. of Electrical Inspectors held a meeting Dec. 20 at Nampa to discuss the state electrical inspection situation under the law passed last year and just now being implemented. Carl Baldridge, loaned to the state by Idaho Power Co. as state electrical inspector, had the assistance of R. J. Larrabee, Underwriters Laboratories, Seattle; W. L. Gaffney, Tacoma, and secretary, Northwestern Section, IAEI; and Thomas Matney, chief inspector, state of Washington, on the program for the meeting.

Gov. C. A. Robins of Idaho has announced appointment of members of the state board of electrical examiners created by the 1947 legislature to examine and license journeymen electricians. Appointed were James Gleave, Moscow, journeyman; C. R. Love, state police officer, and Ralph Webster, contractor, both of Lewiston; H. F. Kochs, contractor, and A. P. Bunderson, state police superintendent, Boise; George L. Thomas, journeyman, Nampa; Don R. Smock, contractor, and Arthur E. Perkins, state police officer, Twin Falls; E. W. Hall, contractor, and Alfred B. Nogo, state police officer, Pocatello, and A. B. Hill, Idaho Falls, journeyman.

● NATIONAL ELECTRICAL WHOLESALERS Assn. passed a strong resolution condemning James C. Petrillo, president of the American Federation of Musicians, for banning the making of records, declaring that such a ban curtails the manufacture and sale of phonographs as well as records and affects the employment of manufacturers, wholesalers and retailers, in addition to injuring the record business.

● L. W. GOING, chief electrical inspector, Portland; M. K. Bliss, engineer, Board of Fire Underwriters of the Pacific, San Francisco; G. E. Kimball, superintending electrical safety engineer, California Division of Industrial Safety, San Francisco, were among the 26 men called to a recent meeting at Underwriters' Laboratories Inc., Chicago. Among items on the agenda were overload protection for oil burner motors and fire or accident experience with electric blankets. So far no such cases had been reported.

Quick Catch-up

EMEA

Electrical Maintenance Engineers Assn. of Southern California is readying the final detail for what promises to be a bigger and even more interesting industrial exposition than its highly successful one last year. In order to provide more space for the additional exhibitors and to allow more room for its previous exhibitors, it will be held in the Los Angeles Armory, Mar. 18, 19 and 20. Although admission is free it is by invitation to those in the industrial and electrical fields. Emerson Richard, president, feels that this year's show will introduce many more devices needed by industry.

First Annual Electrical Industrial Show in San Francisco will be sponsored by the Electrical Maintenance Engineers' Association of Northern Calif. April 2-3. Following the pattern of similar shows held in other large cities, it is planned to issue free tickets to all interested in the use and purchase of electrical equipment, materials and parts. Special efforts are being made to insure a large attendance of those directly engaged in the electrical industry, particularly electricians, engineering and technical society members, trade union members, institution employees, foremen and superintendents.

Quick response by would-be exhibitors to first announcement of the show indicates that the space available in California Hall, where it is to be held, will be filled to overflowing.

W. L. Schiek, district switchgear specialist, and E. B. Hanson, district transformer specialist, both of the General Electric Co., discussed *Modern Industrial Power Distribution* at the Jan. 22 meeting of the EMEA of Northern California, held at the Pacific Gas and Electric Co. building in San Francisco.

AIEE

"With a reasonable break, and barring unforeseen accidents, we'll make it over the hump," was the opinion expressed by Ira A. Collins, assistant engineer of electrical operations, Pacific Gas and Electric Co., before a technical meeting of the AIEE in Oakland, Calif., Jan. 16.

After a thorough analysis of operating problems resulting from the present combination of unprecedented load growth and abnormally low hydro reserves, Collins went on to discuss long-range problems of planning for new expansion under present conditions of long deliveries and uncertain fuel economics. Present deliveries of hydro generation equipment three or four times as long as prewar he said have extended to 10 or 15 years the period of planning ahead for future load growth. Looming large over power production in the west is the increasing cost of fuel oil. He predicted the break even point for oil vs. coal at $2.40 per barrel, a price apparently not too far away. Extended lively discussion after the well-received talk emphasized the importance of the present critical water shortage in the Southwest, where precipitation has been as low as 17% of normal.

Arizona Section met in Tucson under the leadership of the student section, AIEE, at the University of Arizona, with Roy E. Coulson as student chairman. Technical groups discussed industrial, power, and distribution problems.

IES

Lighting Today and Tomorrow was discussed by Samuel G. Hibbens, director of lighting for Westinghouse, at the Utah Chapter meeting in Salt Lake City . . . meeting was held later in the month to ratify changes in the by-laws; guest speaker was George Gilleard of Curtis Lighting Inc.

Southern California Section heard Charles R. Dailey, Ph.D., optical engineer for Paramount Pictures Inc., describe motion picture studio lighting, background projection techniques and equipment.

NECA

New president of the Portland Chapter of NECA is S. I. Jaggar of Jaggar Sroufe Co. Other officers elected at the chapter's annual meeting are: Wes Grasle of the W. R. Grasle Co., vice-president; Earl Webb of the Webb Electric Co., treasurer. A. R. Johnson of the A. R. Johnson Electrical Contracting Co., continues as a member of the NECA board of governors. Members of the executive committee include: Johnson, George Sutherland of the Sutherland Electric Co.; S. S. Adams of the Electrical Construction Co.

Los Angeles members elected the following officers to serve for 1948: Sid F. Hill, president; R. May Fry, vice-president; A. L. Stone, treasurer, and J. B. Shamel, member of the board of governors. Board members elected were: R. E. Arbogast, Jerry Jacobs, C. D. Draucker, R. R. Jones, R. F. Doll, J. B. Shamel, and Howard Stolper.

Refrigeration Contractors Assn.

Ray Winter, San Francisco, was elected president and a director of the Refrigeration Contractors Assn. of Northern California at a recent meeting of the group. Other new directors include: John Mawot, San Francisco; Jess Schinely, San Francisco; Bob Pitcher, Oakland; Bruce Scholes, Oakland. The three directors re-elected for 1948 are: Nat Silverstone, Oakland; Ralph Wetzel, San Francisco; L. E. Kreps, Oakland.

At its first annual convention held in Spokane, the Refrigeration Contractors Assn. of Washington state elected E. S. Matthews of E. S. Matthews Inc., Spokane, as its president. He succeeds James Lessard of Seattle. Neal Korthius of the Korthius Refrigeration Co., Bellingham, was elected vice-president, and A. M. Carney, Seattle, was re-elected secretary. Board members include: Matthews and Harry Wirt of Spokane; K. G. Bentley, Walla Walla; Thomas Morrison, Pasco; John Lavendar, Wenatchee; Clifford Ruxton, Yakima; William Vogel, Chehalis; Fred Cheatham, Olympia; Fred Van Winkle, Tacoma, and C. H. Quinn, Seattle.

IEA

Robert Nevins, manager, appliance and radio department of ZCMI in Salt Lake City, has been elected president of the Salt Lake retail chapter, IEA. Other officers of the chapter include: Clarence Gilner, vice-president; Carlos W. Stone continues as secretary.

New officers of the other chapters are:

Cache Valley Chapter: president, V. L. Ferrin; first vice-president, Clarence Kendrick; second vice-president, Jack Allson; secretary-treasurer, W. E. Dunbar.

Utah County Chapter: president, Eldon McKell; vice-president, Carl Watkins; secretary, H. Gilbert Barton.

Sevier Chapter: president, Frank Parks; vice-president, Clinton Torgenson; second vice-president, Sherman Anderson; secretary, C. R. Thorne.

Southeastern Utah Chapter: president, P. J. Bowman; vice-president, Ted Brown; secretary, H. Gilbert Barton.

Electric Clubs:

Milton G. Sanders, vice-president in charge of sales for the Central Arizona Light & Power Co., was featured

speaker at the Jan. 19 meeting of the Electric Club of San Francisco, discussing the Colorado River controversy. This talk was given previously at the Los Angeles Electric Club by Sanders.

East Bay Electric Club members were shown the new look in electrical wiring by Ray P. Flint of the Northern California Electrical Bureau, who demonstrated with films the adequate wiring program materials now available to the industry . . . members also heard John M. Dodds, engineering consultant of General Electric Co., San Francisco, discuss *Application of Jet Engines to Aircraft.*

First meeting of Electric Club in Portland was held in cooperation with the Northwest Electric Light and Power Assn. Certificates of life membership in NWEL & PA were presented to ten men. Berkeley Snow was the guest master of ceremonies . . . at a subsequent meeting, Walter W. R. May, former president of the club, was guest speaker.

Inland Empire Electrical Dealers Assn.

The various chapters of the Inland Empire Electrical Dealers Assn. have announced its new officers for 1948.

Big Bend Chapter: president, Earl Snyder, Snyder Electric, Washtucna, Wash.; vice-president, Ray Souther, Ritzville Trading Co., Ritzville, Wash.; secretary, Fred J. Williams, Washington Water Power Co., Davenport, Wash.; treasurer, Fred W. Denson, Denson Hardware, Davenport, Wash.

Couer d'Alene Chapter: president, R. W. Burch, Burch's Furniture; vice-president, Claude Whiteley, Whiteley's Electric; secretary-treasurer, Gordon F. DeFoe, Washington Water Power Co.

Lewiston Chapter: president, John Nanniga, John's Electric Shop, Lewiston, Idaho; vice-president, Dewey Scheibe, Erb Hardware, Lewiston; secretary, J. J. Fox, Washington Water Power Co., Lewiston; treasurer, Harley Steiner, Steiner Radio & Appliances, Lewiston.

Palouse Chapter: president, S. C. Haddock, Haddock's Electric, Moscow, Idaho; vice-president, Eldon T. Strom, Strom Electric Co., Troy, Idaho; secretary, L. A. Winn, Washington Water Power Co., Pullman, Wash.; treasurer, A. T. Olson, Tate Electric, Pullman.

New officers of the Spokane Chapter were announced in the December issue of ELECTRICAL WEST.

Quarterly membership meetings of all the chapters was scheduled for February in Spokane; subject under discussion—*What to Sell, How to Sell It,* and *Who Will Buy.*

PANORAMA OF THE PCEA

Edited by A. X. Schilling

Workshop

The association's first home economics workshop, appropriately entitled "Western Parade of Demonstration Ideas," was scheduled for Los Angeles on Feb. 19 and 20. Attendance is limited to home economists of utilities, manufacturers and distributor members of PCEA, except that home economists from the municipal systems of Los Angeles, Glendale, Burbank, and Pasadena were invited to participate.

Other utilities taking an active part in the event are California Electric Power Co., Pacific Gas and Electric Co., San Diego Gas & Electric Co., Coast Counties Gas & Electric Co. and Southern California Edison Co.

The first day's session opens with a welcome by H. C. Rice, chairman of the Electrical Living Committee, followed by these demonstrations and speakers: *Cinching the Sale,* by Mrs. Thelma Fahrenkrog, Coast Counties Gas & Electric Co., and Mrs. Theia Kamerer, Southern California Edison Co.; *Demonstration Techniques in Action,* by Miss Alice Brown, Hawaiian Pineapple Co.; *Dough Tricks,* by Mrs. Wilma Lohmeyer, Wheat Flour Institute; *Five Days in the Cooler,* technicolor movie by *McCall's Magazine; Selling Cold,* by Mrs. Marjorie Harper, General Electric Co., and *Presenting the Home Freezer,* by T. J. McIntire. In addition, two discussion periods are provided and the group is to attend a luncheon with the Deepfreeze Division, Motor Products Corp., acting as host.

The second day's program includes *Tested Recipes for Home Laundering,* by Lois Ferris, Westinghouse Electric Corp.; *Into the Suds and Out,* a *McCall's Magazine* technicolor movie; *The Rotary Ironer,* by Mary Louise Parks, Leo J. Meyberg Co.; *The Flatplate Ironer,* by Bernice Lowen, Los Angeles; *The Hand Iron,* by Mrs. Dorothy S. Huse, Proctor Electric Co.; *The Meat Makes the Meal,* by Mabel E. Cramer, Swift & Co.; *Be a Guest in Your Home—Cook Electrically,* by Mrs. Geri Furst, Hotpoint Inc., and *Kitchen Magic,* a *McCall's Magazine* technicolor movie. Two discussion periods are also provided during the second day's program, and the Proctor Electric Co. will be host at the luncheon.

Marguerite Fenner, director of home economics for the Pacific Gas and Electric Co., and chairman of PCEA's home economist committee, is chairman for the workshop, which will be conducted in the May Co. auditorium on Crenshaw Blvd., Los Angeles.

Purpose of the two-day session is to provide a refresher and training course for home economists, with instruction by specialists in food preparation, quick freezing, home laundering and related topics. The techniques of conducting demonstrations and making home calls will be explained and portrayed.

● THE safety committee appointed by president H. H. Courtright will hold its first meeting soon at the call of A. D. Bragg, chairman of the Operating Economics Committee. The purpose of the safety committee is to examine the safety rules and practices of utilities to determine whether there is a basis for standardization. Members of the committee, who will appoint a chairman from their own group, are: J. E. Smith, San Diego Gas & Electric Co.; C. A. Fischback, Southern California Edison Co.; W. E. Brown, Sierra Pacific Power Co.; R. W. White and E. C. Hunt, Pacific Gas and Electric Co.; G. E. Bishop, Coast Counties Gas & Electric Co.; Paul H. Yelton, California Electric Power Co.; William Osborne, Central Arizona Light & Power Co.; Harry V. Chambers, Tucson Gas, Electric Light & Power Co., and Max Llewellyn, Arizona Edison Co.

● THE newly appointed advertising committee, organized to enable members to exchange ideas on advertising and to capitalize on national advertising, held its first meeting during the Fresno conference. Members of the committee are: M. G. Sanders, Central Arizona Light & Power Co., chairman; W. A. Cyr, ELECTRICAL WEST, vice-chairman; L. Wallenberger, Coast Counties Gas & Electric Co.; H. W. Hayes, Southern California Edison Co.; R. R. Gros, Pacific Gas and Electric Co.; F. M. Raymond, San Diego Gas & Electric Co.; Tom Crosbie, California Electric Power Co.; J. A. Corlett, General Electric Co.; H. S. Schuler, Westinghouse Electric Corp.; H. E. Silvernail, Graybar Electric Co., and James Scales, Leo J. Meyberg Co.

ELECTRICAL WEST

Monumental

THE job performed by the electrical industry of the Far West, as set forth in the pages of this issue, represents a monumental achievement. The light and power systems in 1947 furnished more kilowatt-hours to more customers than ever before in their history. And they did this despite drought, material shortages, over-taxed capacity and over-worked manpower. The electrical manufacturers made more appliances, meters, transformers, wire and countless other items of equipment than ever before. And this performance was accomplished in the face of unprecedented shortages of raw materials and components. Contractors wired more homes and factories, dealers sold a larger dollar volume of appliances. Yes, 1947 was a record year.

Even so no crystal gazer nor professional prophet is needed to foretell of 1948. Its story also will be found in the pages of this issue. Light and power systems are engaged in the greatest construction programs in their history in an endeavor to catch up with huge demands that are projected as far ahead as 1952. Manufacturers are being asked to step up record productions to meet the requirements of the Marshall Plan as well as domestic demands. The housing shortage and industrial and commercial expansion insure work for the contractors. And the public appetite for electric ranges, refrigerators and other labor-saving appliances is far from satisfied. The West's population, industry, commerce and agriculture are increasing.

Today, we can surely predict that at the close of 1948 we will again say "another monumental achievement for the electrical industry."

Money for Financing

SECRETARY of Commerce Harriman says that the capital requirements of industry have no bearing upon income tax reduction. New capital to finance industrial expansion is available and tax reduction for this purpose is unnecessary according to him. If the Secretary of Commerce had been familiar with the fiscal picture of the electric utility industry, he could not have been so positive. The light and power industry's capital requirements are enormous and are an economic necessity. Upwards of half of the $6 billion utility construction program must be financed through new securities. The investing public is the only source from which these funds may be obtained. And the utilities are only one of several major industries competing in the capital markets. High income taxes have drained off a large proportion of the funds normally available for investment. Tax reduction now would restore those funds. Certainly there is nothing inflationary in the financing of industrial expansion. As a matter of fact, when such expansion stops, the national economy will be in for trouble.

A. Emory Wishon

SOMETHING boyish, untamed and natural and therefore sincere, qualities that are not often found in the top executives of business, was so characteristic of A. Emory Wishon that to those who knew him it is irreplaceable. When Emory Wishon died, he took this and many other human and lovable attributes with him, and this business is poorer for it. Even the giant Pacific Gas and Electric Co., to which he had risen as vice-president and general manager, did not seem big and impersonal as long as Emory Wishon had anything to do with it.

One might have had difficulty hearing the rush of words, chewed off before they were half uttered, that came out of the side of his mouth as he talked, but there was no mistaking their sense, their meaning, their freedom from bunk or pomp. It was straight from the shoulder stuff. He had one other gift—he developed men. He gave them jobs to tax their abilities but it was their job to do, not his to dictate. He expected a lot, but his men loved to give him more than he asked even. It was rare leadership.

To the Wishons, father and son. the electrical industry of the West owes more than it knows. Both pioneered in making the desert bloom and become a paradise for men who followed. It is a shame that Emory could not have lived as long as his father in order to finish many of the tasks only he could perform.

EDITORIAL VIEWS

Looking for Scapegoats

ONE of the least admirable attributes of an election year is that those who seek to be re-elected and those who seek to supplant them stir around so seeking for someone else to blame for whatever ails the people. In past political years the utilities were made the scapegoats to blame for everything from the flu to hoof and mouth disease.

The current search for victims for the public pillory seems to be directed upon electrical manufacturers, wholesalers and contractors. Somebody has got to be blamed for the high cost of building besides the administration.

If the investigation were in truth a search for the facts, instead of quite visibly a seeking of something to hang on somebody to prove a predetermined conviction, they would be salutary. If they could open the eyes of everyone to the realities of high labor cost due both to high wage rates and to low efficiency of workmen, to some of the unnecessarily restrictive codes and ordinances, to the cost of uncertainty of supplies that must be protected against by escalator clauses and extra contingency fees, such investigations would be honest. But they might not turn up any "rascals" to hang the blame upon.

It is in the line of questions of the investigators that the purpose is revealed, and to the shame of the Department of Justice, the objective seems more to be "villains" than facts.

Is it a Plot?

HUMAN beings, individually or collectively, adopt some unique defense mechanisms when temporarily embarrassed. One man or a whole group allied in a political party can invent queer excuses for behavior when put on the spot. Take, for instance, the labor government in England. There as elsewhere electric consumption has grown by leaps and bounds since the war. And the government-owned power supply systems have been overtaxed to the point of rationing electricity. As an excuse for inability to serve the load, it is suggested that the increased demands for electricity are due to some deep dark political maneuver against the government. The charge is as logical as blaming the government for the huge electrical demands that are taxing the American light and power companies. In both instances it is just that the public, appreciating the value of electric service, wants more of it.

THE fact that men exchange goods and services with each other makes it possible to have division and specialization of labor, tools and machines that multiply by more than fifty times the ability of man to produce goods. That is why America has the highest standard of living in the world. But the miracle that makes it possible is the simple fact that both parties to an exchange profit by the transaction. If ever the profit is all on one side, men will stop exchanging, and civilization will move back over the centuries that separate us from the primitive savage. Both the buyer and the seller make a profit on the same transaction because each gives up less than he gets in exchange for it. What makes an article worth more or less is our attitude toward it. Thus, a glass of water is a glass of water, and a hamburger sandwich is a hamburger sandwich. But if I am thirsty and you are not, the identical glass of water is worth more to me than it is to you. If you are hungry and I am not, the identical hamburger sandwich is worth more to you than it is to me. So, if I give you a hamburger sandwich in exchange for a glass of water from you, each of us is giving up less than he gets, and we both make a profit on the transaction. That is why one of the worst things that could happen to the world would be to make us all alike. Because we are different and have different ideas of what is good or bad, or what is worth more and what is worth less, we can trade goods and services with each other and all of us profit by doing so. That is why the profit motive is indispensable to civilization.—Dr. Alfred P. Haake, economist, lecturer and author.

THE MONTH IN BRIEF

Long Beach to Vote on Municipal Ownership

Proposal for a municipally owned power system will be voted upon in Long Beach, Calif., on Feb. 24. The city is presently served by Southern California Edison Co., under a 35-year franchise expiring in 1975. The proposal is one of 12 initiated by a group which hired a professional manager to circulate its petitions and disbanded after they were certified for the ballot. The city bureau of franchises estimated that a $47,000,000 bond issue would be required to buy out the private power company, the estimate based on assessed valuations—$2,000,000 for land, $16,900,000 for improvements and $4,600,000 for personal property on which Edison pays some $290,400 a year in taxes.

Gas Rate Cut Benefits Arizona Companies

Recent announcement by El Paso Natural Gas Co. that it would cut rates and make available an additional 14,000,000 cu. ft. of gas annually for conversion to electric energy is expected to relieve the tight power situation in Arizona, caused by drought conditions. The one-cent rate reduction, coupled with the guarantee of firm power may permit power companies in the area to abandon use of fuel oil for generating purposes. High cost of fuel oil had threatened electric rate increases in the territory.

High Court Rules Out Survey

Bringing to an end almost three years of legal debate, the Arizona supreme court has ruled unconstitutional a 1945 law setting up $50,000 for a federal investigation into electric rates in the state. The court stated that it did not see anything unusual or illegal in a state agency's utilizing the services of FPC on a rate survey, but that the legislative act which provided for the survey infringed on the rights of the state corporation commission and, in effect, decreased its powers.

Towns Vote for Public Power

Trinidad, Colo., taxpayers on Jan. 7 voted for a municipally owned light and power plant by a margin of ten to one, final count showing a total of 2,189 for and 227 against. On the same date, Springer, N. M., voted in municipal ownership by a margin of 238 to 80. Both towns are served by Frontier Power Co. The Trinidad election authorizes construction of a $1,500,000 plant but some delay is in prospect. The city council had previously passed an ordinance authorizing a publicly owned electric generating and distributing unit, but a court ruling nullified it because interest rates were unspecified and maturity dates were lacking. Contests in both towns were bitter. In Trinidad, headquarters of Frontier Power Co., supporters of the measure contended that the company was owned 93% by a Wall Street concern, instead of being a Colorado owned corporation as represented by the company's management.

Power Pays Two to One

According to *How Reclamation Pays*, a survey released by USBR, receipts from energy sales will amortize $1,032,250,672 of a total construction cost of $2,086,760,000 for 72 present federal reclamation projects. Irrigationists are expected to return $687,357,749 of the total in payments for water, with other projects amounting to $35,027,000. The survey shows that the Reclamation Bureau has allocated $511,922,036 of estimated power receipts to irrigation costs. Amortization of the investment in power facilities of the projects, including interest, will absorb $520,328,636 from the same sources, according to the bureau. Sixteen projects accounted for total investment in power facilities. Three major developments—Boulder Canyon, Columbia Basin and Central Valley—are scheduled to repay $851,511,366 of total power repayments.

WWP Buys Idaho System

Washington Water Power Co. has purchased an electrical distribution system at Elk River, Idaho, formerly owned and operated by the Village of Elk River. Residents of the town voted unanimously for the sale after having operated the lines for 15 years. Subject to approval of the Idaho Public Utilities Committee, the sales contract includes a 25-year franchise. Washington Water Power announced a 50% reduction in electric rates for Elk River, effective immediately. The purchase is the third such transaction the company has completed in northern Idaho in the past six months.

Water Users Up Power Rates

Power rate increases averaging approximately 30% have been put into effect by the Salt River Valley Water Users Assn. The new schedules affect pumping power rates and wholesale electric sales to districts where the Water Users deliver for distribution. Rates for domestic use have not been changed. The increase was made necessary by the drought which raised demand and cut hydroelectric power production. It will be effective after February meter readings and new contracts will carry an escalator clause providing for further increases based on increases in fuel or purchased power costs.

Irrigation District Gets Surplus Energy

To help save crops threatened by power shortage in the Imperial Irrigation District, Los Angeles Department of Water & Power is making available five million kilowatt-hours of surplus energy. The power is being sold to California Electric Power Co. for delivery to the district. Contract will extend through May 1, and billing will be on the basis of $1.25 per kilowatt of highest monthly 30-minute maximum demand during the month or any previous month, plus a charge of .0068 cent per kilowatt-hour.

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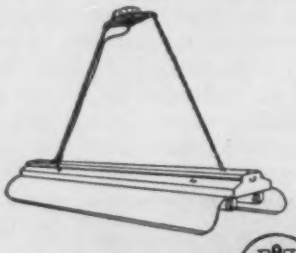

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*Patent No. D-141024, others pending. Underwriters approved

IT'S EASY TO SEE WHEN IT'S DAY-BRITE Lighting

THIS MONTH'S NEWS

House-Heating Rates Turned Down at Seattle

Puget Sound Power & Light Co.'s request for new electrical house heating rates almost double those in effect, has been turned down by the Washington Department of Public Utilities. The proposed rates are the same as those set up by Seattle City Light, which is not under jurisdiction of the state department.

State Director Andrew J. Zimmerman denied the power company's petition on grounds that it would "establish a differential between present and future house heating consumers, which is contrary to the spirit of existing statutes," and "because the company failed to establish necessity for increased revenue on the basis of its entire financial problem."

As proposed by the company, and now established by City Light, higher rates for electric heat would affect only those who installed permanent heating equipment after Jan. 1, 1948. Rates on equipment previously installed would have remained unchanged until Jan. 1, 1952, as under the City Light rates.

The department's order was issued "without prejudice to the company's right to seek further relief" in the event increased home heating should impose an "abnormal demand" upon the company's facilities.

● FPC tells accomplishments of private power companies in improving basic financial soundness in a report, *Financial Record of The Electric Utility Industry*, 1937-1946. Copies may be secured without charge from the Division of Publications, Federal Power Commission, Washington, D. C., asking for FPC-S-57.

● NEWPORT NEWS Shipbuilding and Drydock Co. submitted the sole bid ($2,570,000) for three 165,000-hp. turbines to drive new generators for Grand Coulee Dam. The turbines, for units R-4, 5 and 6 in the east power house, will weigh about 1½ million pounds when installed.

● FRESNO (Calif.) Irrigation District has applied for a preliminary permit for a hydroelectric project on the North Fork and main channel of Kings River in Fresno County. FPC hearing was to open Jan. 26.

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A.S.T.M. Oil Resistance, Hot	Unaffected
Solvent	V.M. & P Naphtha
Non Volatile	50%

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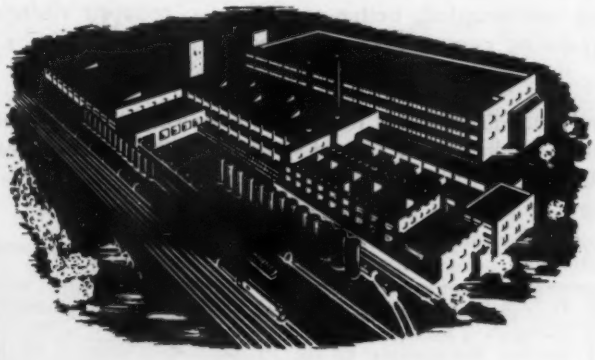

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ENGINEERS
Electrical and Mechanical Engineers and Draftsmen. Experienced in design of steam plants and sub-stations. For work in San Francisco and Los Angeles. Ideal climate and living conditions. State salary desired and give details of education, experience, age and availability. **Address Box 241, Electrical West, 68 Post St., San Francisco 4, Calif.**

ARMY TO BUILD FOLSOM DAM
USBR WILL OPERATE IT

Bureau of Reclamation won its argument with the Army Engineers over control of the proposed Folsom Dam on California's American River. But not until the matter had been carried to the White House.

Last month, in a request to Congress for enabling legislation, the President laid down the terms of agreement on the project. The Army will build the dam, he proposed, with increased storage capacity. Reclamation Bureau is slated to take over the project upon completion and to construct and operate the power plant at the site, also.

The Engineers were authorized by Congress to build the dam in 1944, over Reclamation Bureau protests that it should be an integrated unit of the Central Valley reclamation project. President Truman included $3,370,000 in his budget for fiscal 1949 to start construction by the Engineers at Folsom.

His message last week asked that Congress authorize the project anew, permitting increase of the reservoir capacity from the planned 355,000 acre-ft. to 1,000,000 acre-ft. The Engineers are amending their construction plans on this basis, he reported.

"The power plant at Folsom must be integrated with the hydroelectric power plants at Shasta and Keswick . . . and with the Delta-Mendota pumping plant of the Central Valley project, all of which must be operated as a unit," the President said. "To achieve such coordinated operation the Folsom Dam and reservoir . . . should be transferred to the Bureau of Reclamation for operation and maintenance."

Folsom power would be used as a "second source of energy" for the Delta-Mendota plant and "for other irrigation pumping." Many related developments in the Central Valley would not be financially feasible without the income from Folsom's power revenues, the President asserted.

Original plans of the Engineers provided for a 76,000-kw. hydroelectric plant at Folsom.

● REA will ask certain borrowers to assume responsibility for auditing their general accounts, Administrator Claude R. Wickard announced last month. The new policy applies to borrowers whose lines have been in service an average of five years and whose net worth equals 25% of assets. Almost 10% of REA borrowers meet these qualifications, Wickard said. REA will continue to audit the special construction fund accounts, which include funds advanced by the agency.

● AERIAL PATROL of power lines is being inaugurated by Pacific Gas and Electric Co., according to D. D. Smalley, vice-president, who announced that the company has contracts for emergency and routine service with the Helicopter Services of California and the Armstrong-Flint Helicopter Service.

● SEC offices last month were moved back to Washington, D. C., from wartime headquarters in Philadelphia.

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of Motor Performance with
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When you install Helwig-Speer MULTIFLEX Brushes on your rotating equipment, you're taking advantage of advanced engineering. For MULTIFLEX Brushes give you uninterrupted, better contact . . . reduced vibration . . . lower circulating current . . . even wear.

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A handy way to stock brushes
— There's a Helwig Brush Kit for every purpose. For example, Kit No. 10 contains brushes, springs and wicks for 175 types of vacuum cleaners. You don't have to order a complete kit if you run low on a popular brush. Simply consult Bulletin 65 and request the number you need from the Helwig office nearest you.

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Makers of Multiflex and Transert Brushes

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(2) Correctly timed baking

This is Monarch's widely advertised Electric Roaster Range with 2 ovens —a regular full-size oven, and a built-in surface oven, roaster size. Both ovens are timer-clock controlled.

WHEN Mrs. Homemaker goes out for the afternoon, leaving her evening meal to the guardianship of her automatically controlled oven — this is only *one* use to which the Monarch timer-clock can be put, or for that matter, *any* timer clock.

On the Monarch Roaster Range the timer-clock can be used for *correctly timing* baking and roasting operations. The clock can be set to turn the heat OFF 30 minutes ahead of time, finishing the operation on *stored heat*. Thus, overbaking is avoided—the cook doesn't have to keep watching the clock — she can assure herself accurate, cook-book timing!

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in the Industry!

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Once again—the biggest, most profitable sales promotion campaign that ever stood behind *any* home laundry product—and now bigger than ever!

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That's why you'll make a big splash with BENDIX!

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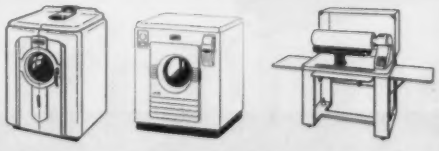

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TYPE P—AC Motor Starting Capacitors

The *plastic* case prevents moisture absorption and lengthens operating life. An excellent replacement for aluminum case capacitors with cardboard sleeves. For original equipment use, or if bracket as well as capacitor needs replacement, a splash-proof plastic end cap and easy-to-install "snap-on" mounting bracket are available.

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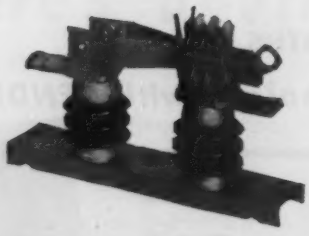

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NORTHWEST GROUP ASKS CONTINUING POWER PROGRAM

Repeating its earlier warning that the Pacific Northwest faces a critical power shortage unless present power development plans are carried out, the Pacific Northwest Utilities Conference Committee has requested the federal government to make distinction in budget making between ordinary public works and the power development program in the area. Such a distinction will make possible a separate, continuing program, the committee declared.

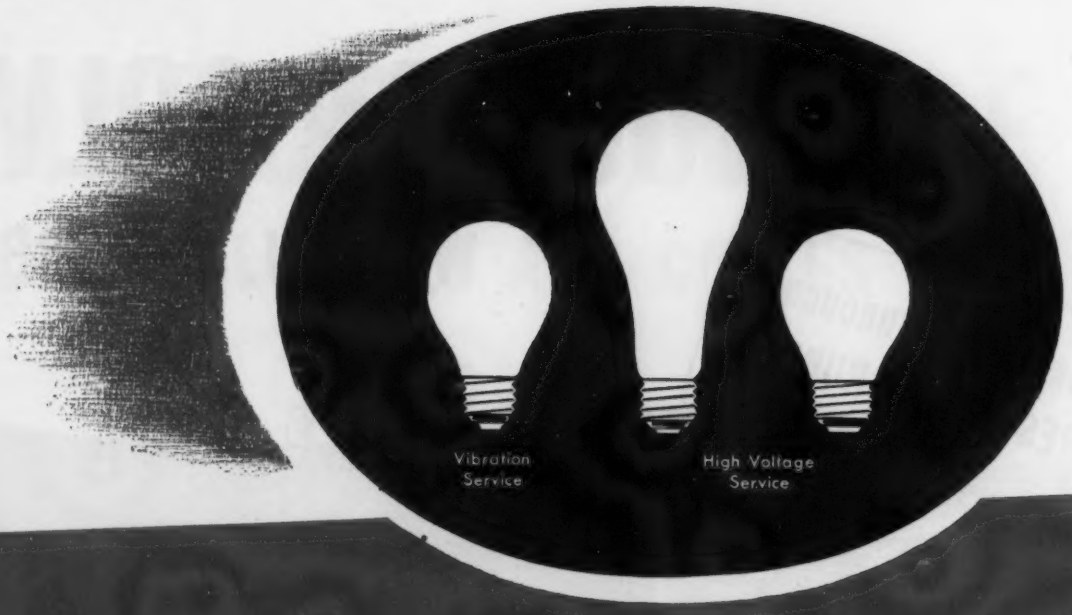
Representatives of private and public power agencies in the area warned that, even though the federally approved power projects are completed as soon as is physically possible, the installed capacity will not catch up with the estimated power requirements until 1954. Should a low-water year occur before that time, a critical situation might develop.

The committee urged that the federal administration plan its expenditures for Columbia River power development in such a way as to coordinate to the fullest the necessary construction of generating projects with each other and with the construction of transmission and substation facilities.

C. A. Erdahl, Tacoma, Wash., commissioner of public utilities, is chairman of the committee. Other members are Paul B. McKee, president, Pacific Power & Light; James H. Polhemus, president, Portland General Electric; Z. E. Merrill, president, Mountain States Power Co.; W. C. Snow, assistant superintendent, Seattle City Light; H. C. Webb, vice-president, Puget Sound Power & Light; K. M. Robinson, president, Washington Water Power, and C. T. Hurd, president, Northwest Public Power Assn.

Following the utility meeting, the Columbia River Salmon and Tuna Packers Assn. presented figures claimed to show that the additional generating capacity of 1,976,000 kw. before 1956, called for at the conference, could be more than met by installation of additional generators in plants already built and under construction.

● FPC has published Federal Power Commission Reports, Volume 5, covering the year 1946 and containing opinions and decisions issued. Copies may be secured from the Division of Publications, Federal Power Commission, Washington, D. C., or from the Government Printing Office, by writing for Publication FPC-A-33. Price is $2.75.



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Lamps for vibration service are especially constructed to withstand punishing applications, such as on highspeed machinery. Lamps for rough service are constructed to withstand severe jars. Both types available in 50- and 100-watt sizes.

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1. Proper industrial light pays four ways. It improves working conditions, speeds production, reduces waste, and promotes safety.
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3. Westinghouse lamps are a quality product, which are given 485 tests and inspections from raw material to finished product.
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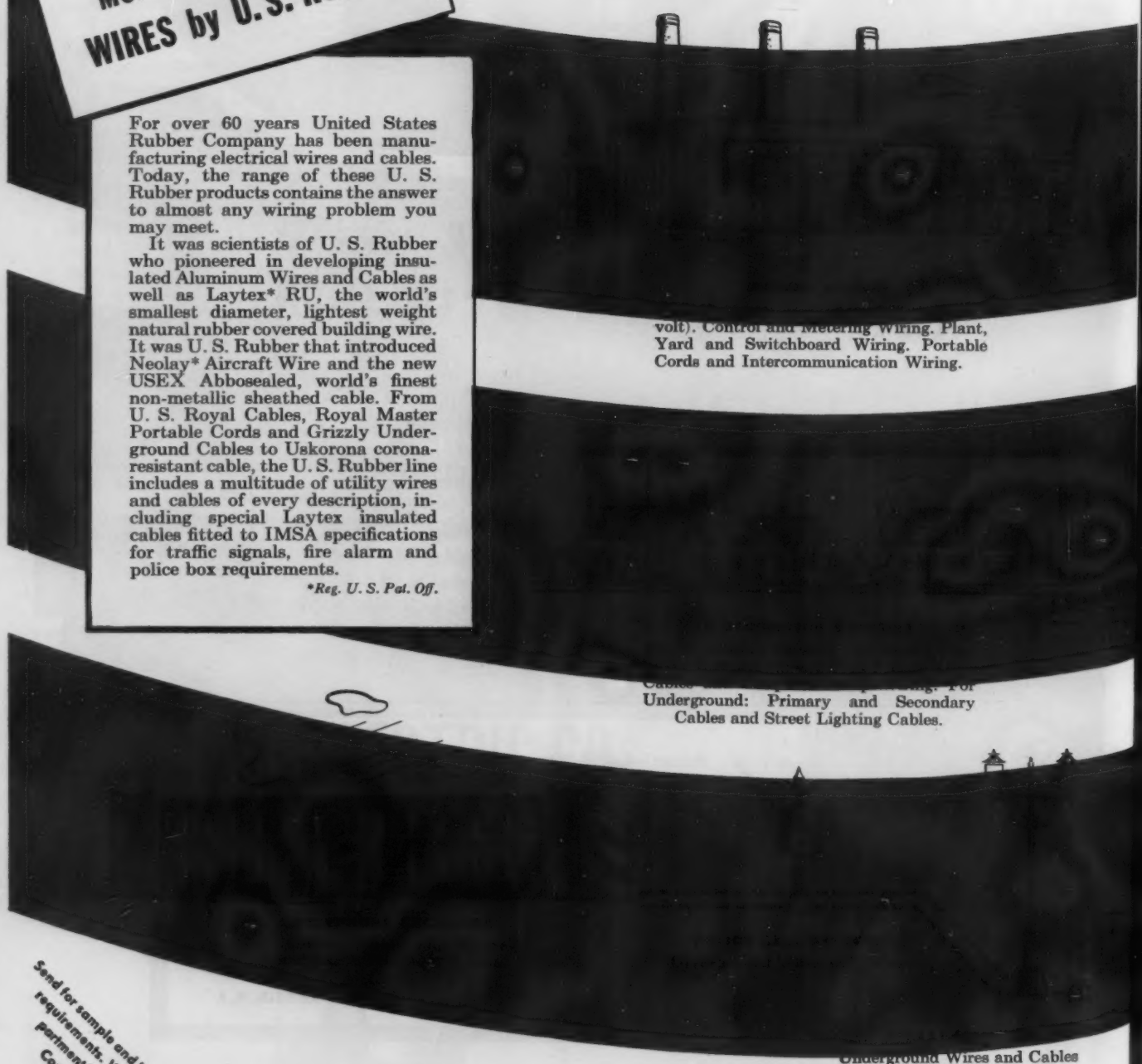

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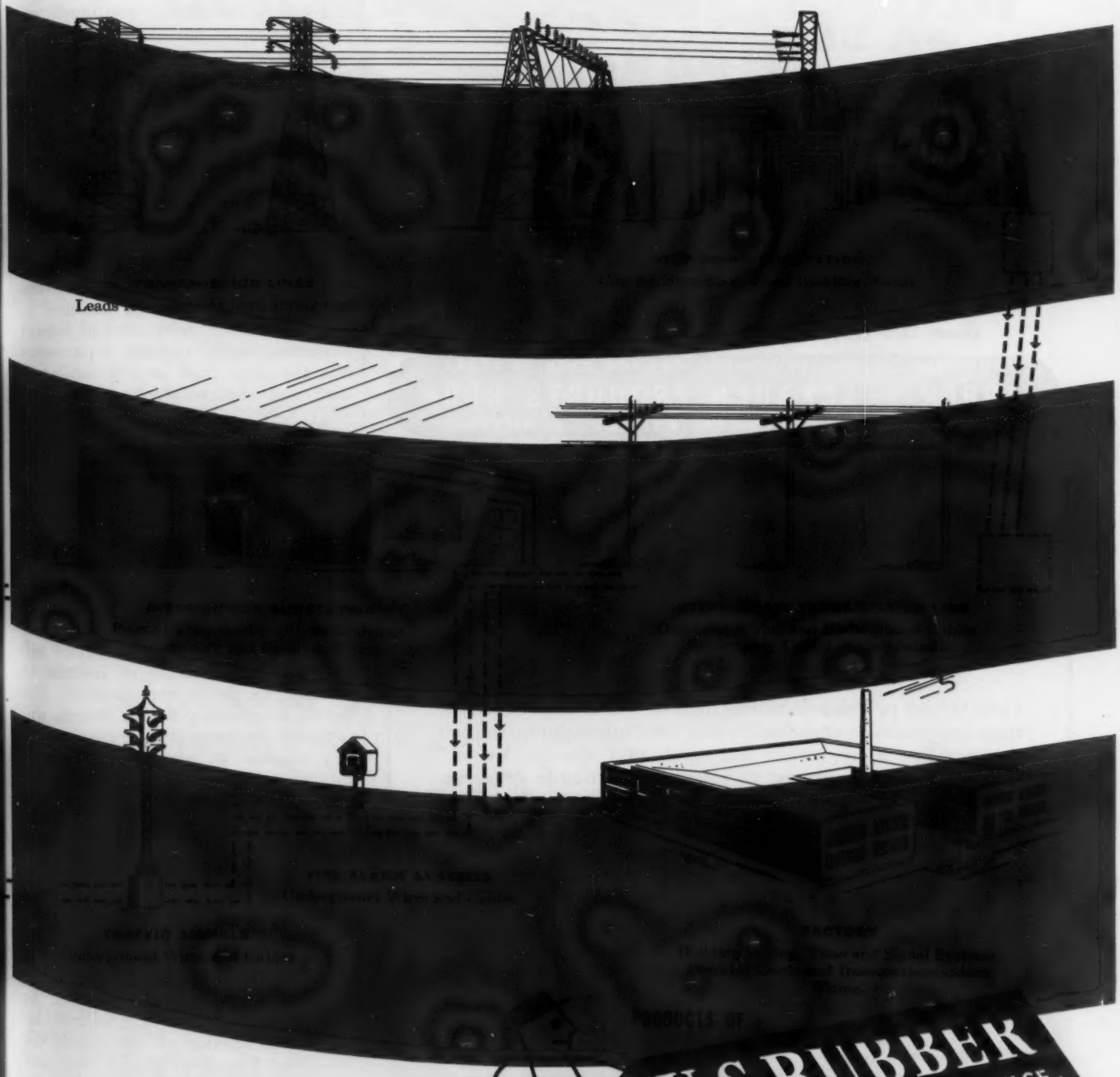

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BLACKBURN Service Entrance Connectors cost no more originally. In the long run—year after year—they actually cost less, because they last longer and give better service. That's due to their high-strength construction of DURONZE, which is over 50% stronger than hard copper or commercial bronze commonly used in the trade. Also, their circular construction gives them extra strength along the line of pull of the screw. Cut maintenance costs, with BLACKBURN Connectors!

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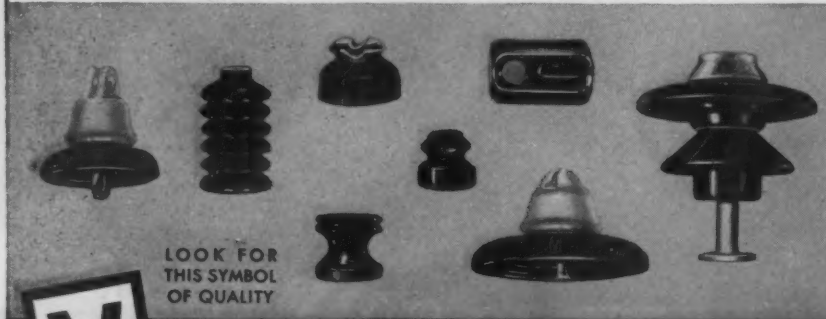

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VICTOR INSULATORS, Inc., Victor, N.Y.
BIRTHPLACE OF FIRST WET PROCESS HIGH-VOLTAGE INSULATORS

SENATOR SEEKS PROJECT FINANCING BY BOND SALES

Senator Harry Cain, Washington Republican, is sponsoring legislation providing for funding of major federal reclamation projects through sales of federal bonds, rather than by direct appropriations.

Cain first suggested that bonds be sold to the public by the Treasury to finance all features of projects listed by Reclamation as "self-liquidating." His later plans call for continued appropriations for navigation, flood control and other non-reimbursable features of multiple-purpose projects.

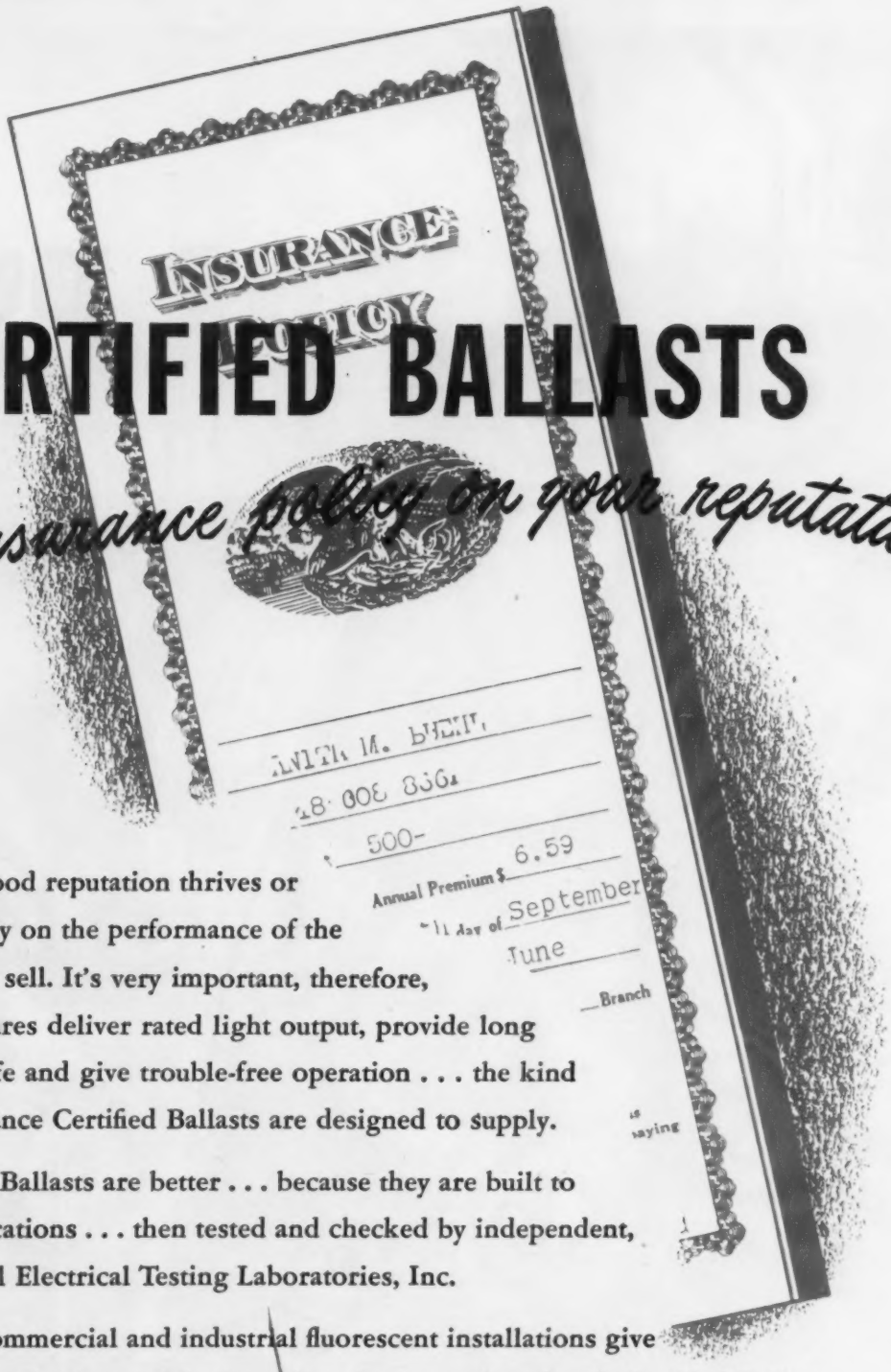
Proceeds from bond sales would go into a new account in the Treasury; Congress would continue its control of reclamation expenditures by making annual allocations from this account.

Power revenues from multi-purpose reclamation projects would be channeled into another new Treasury fund, earmarked to pay off principal and interest on the reclamation bonds. Irrigation features would be financed in the same manner, with users of federal irrigation water making repayments into the same fund or one similar to that established with power revenues.

Seattle Radio Program to Discuss Local Problems

Proposed purchase of Puget Sound Power & Light Co. properties in the Seattle area by Seattle City Light, will be the first two in a series of radio programs over Station KOMO, headed "Bill Smith, Plaintiff." The series will discuss local problems of interest to citizens. In the power question, Bill Smith, an ordinary Seattle citizen, will subpoena business men, engineers and city officials as witnesses to inform him what is going on in the proposed purchase. Both sides of the question will be presented, and a jury of citizens chosen by Seattle service clubs, will hear the testimony and render a verdict.

● GRANT COUNTY PUD, Moses Lake, Wash., has completed sale of $413,000 in revenue bonds, Manager Glenn A. Smothers reports. The money will be used for construction of new lines, including completion of one which will carry the first electricity to the Ruff and Wheeler areas. The bonds were bought by John Nuveen & Co. of Chicago. The new issue brings to a total of $2,013,000 in revenue bonds issued by the PUD since it began operation in 1945.



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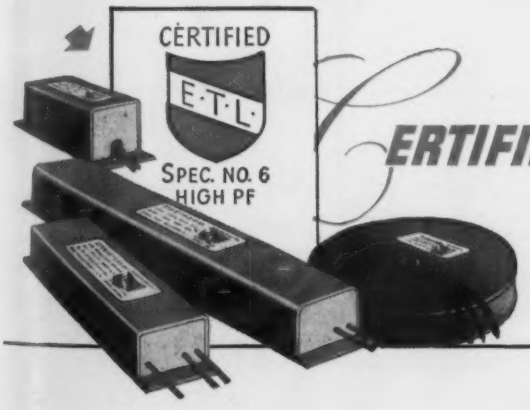
Your good reputation thrives or falters largely on the performance of the fixtures you sell. It's very important, therefore, that your fixtures deliver rated light output, provide long lamp life and give trouble-free operation . . . the kind of performance Certified Ballasts are designed to supply.

Certified Ballasts are better . . . because they are built to rigid specifications . . . then tested and checked by independent, impartial Electrical Testing Laboratories, Inc.

That's why commercial and industrial fluorescent installations give more lasting satisfaction when they're equipped with Certified Ballasts.



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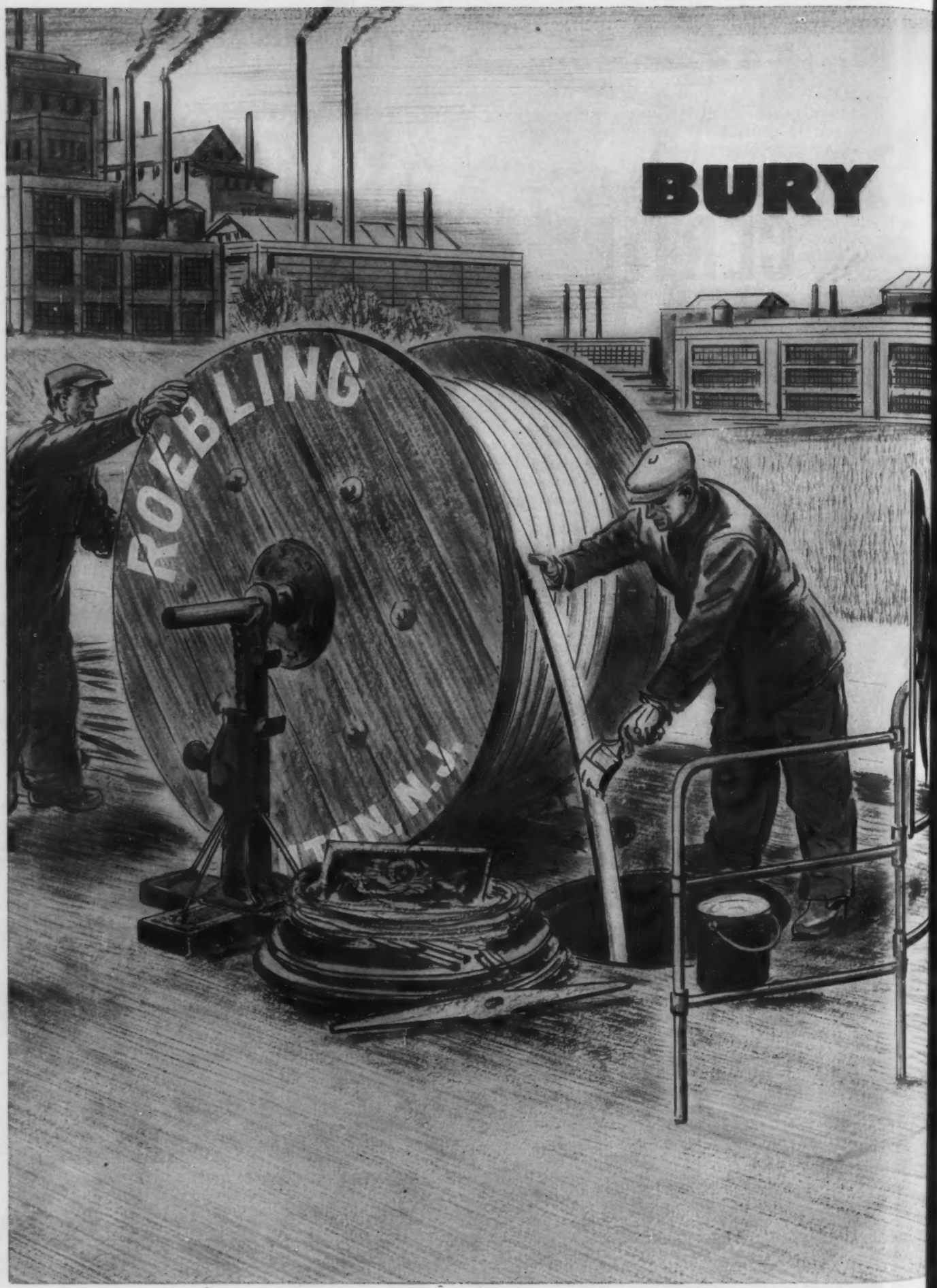
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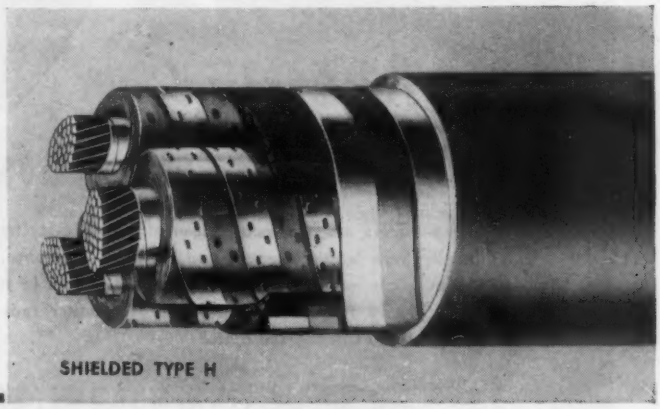

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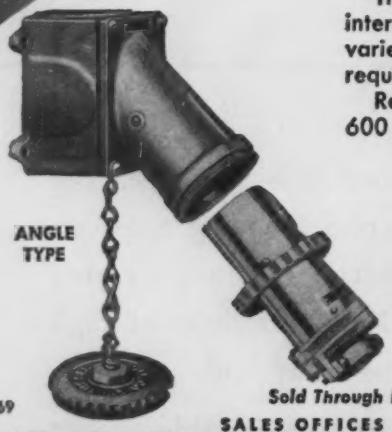
Many unique built-in features insure adequate *safety factors*, assure *low maintenance*, and allow *ease of installation*.

The high degree of standardization and interchangeability of parts provide a wide variety of types and sizes to meet every requirement.

Ratings from 30 to 400 amps., 250 and 600 volts.



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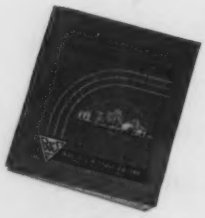

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BATTLE CREEK, MICHIGAN

Unique, Interlocking Construction. Clamp automatically adjusts itself to fit all usual sizes of wire.

B. C. POWER COMMISSION TO CALL BIDS ON POWER PROJECT

Bids will be called soon for the $4,500,000 Whatshan-Arrow Lakes power project, which will serve the Okanagan district in interior British Columbia. Specifications are now being drawn up by the B.C. Power Commission.

The project includes a dam at the outlet of Whatshan Lake, a two-mile tunnel to the west shore of Arrow Lake, a power plant at Arrow Lake with two 25,000-hp. generating units and a 132,000-volt transmission line to Vernon, 70 miles west. Cost is estimated at $3,500,000 for the generating plant and dam, and $1,000,000 for the transmission line.

● SOUTHERN California Edison last month filed application with the California Public Utilities Commission for permission to issue $40,000,000 worth of first mortgage bonds. This financing program will follow by less than 60 days the public offering of 800,000 shares of cumulative preferred at $26.25 per share. Upon completion of the program, which is being used to finance some $125,000,000 in new power facilities before 1950, capitalization of the company will consist of $178,000,000 of first mortgage bonds; 160,000 shares of original preferred stock; 1,653,429 shares of 4.32% preferred; 1,653,071 shares of 4.48% preference stock; 800,000 of cumulative preferred stock 4.88% series and 3,183,091 shares of common.

● CLARK COUNTY (Wash.) PUD commissioners have accepted the bid of Ballard Hassett Co. of Des Moines, Iowa, on a $5,850,000 bond issue to finance purchase of the Pacific Power & Light Co. system in the county. The bid called for a discount of $4.10 per $100 and interest at 3½% and provided for recalling the bonds in reverse order after Dec. 1, 1950, at a call premium of 1½% on the first $2,635,000; 2% on $1,815,000 and 2½% on $1,400,000. The call premium would reduce ¼ of 1% every six months.

● COLORADO and Wyoming residents hold 58% of Public Service Co. of Colorado's new preferred stock. John E. Loiseau, president, reported, following an analysis showing the securities in possession of 4,363 stockholders with an average ownership of 33 shares. The new stock was issued during August 1947 and paid its first dividend Dec. 1 on 160,000 shares of $100 par value stock.

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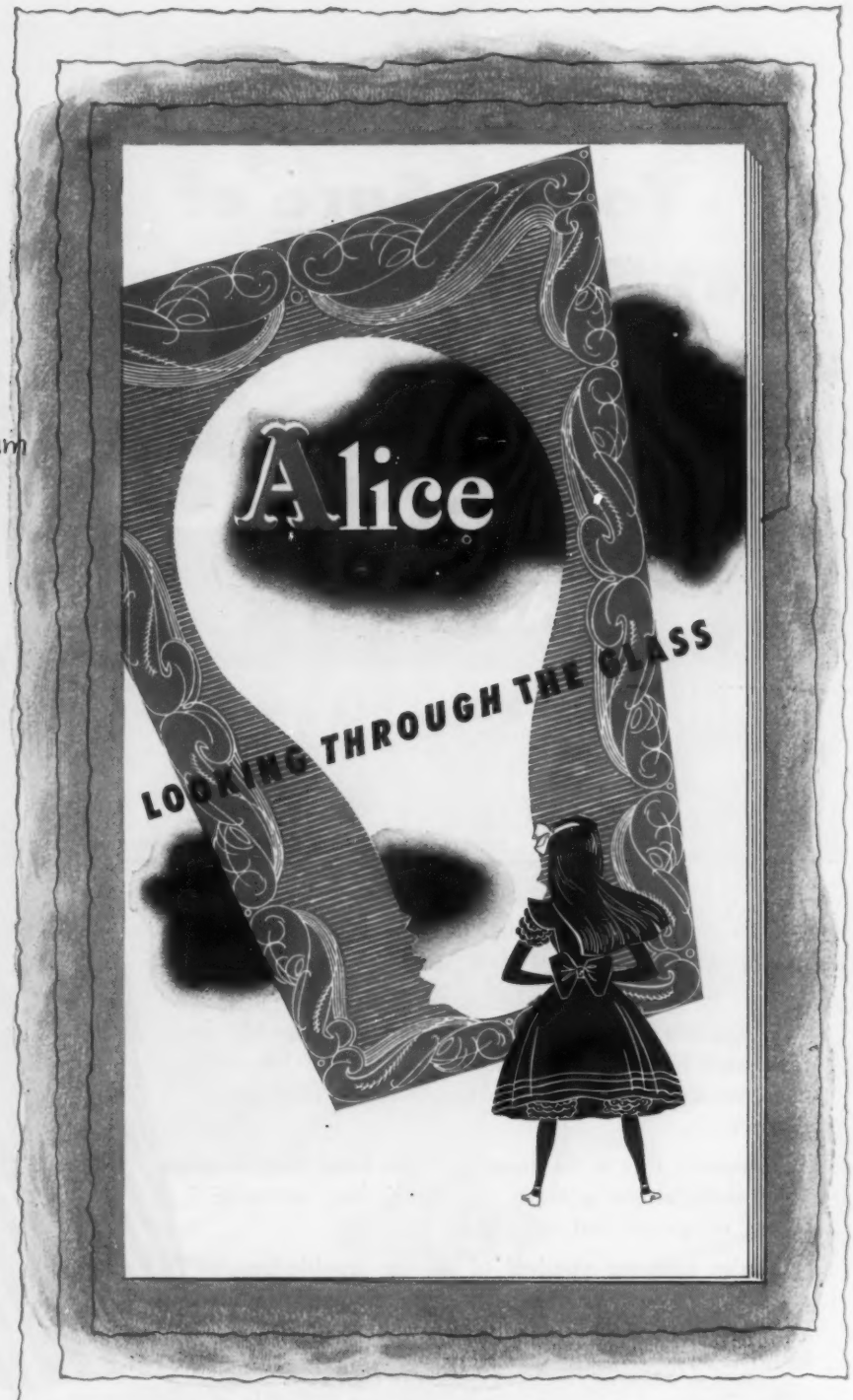
Planned Lighting Tool

for your home education program

Here it is—actual size—a brand new General Electric 20-page booklet to help you "educate" your residential customers on the correct use of lamp bulbs. Now off-peak home lighting load is more desirable than ever. And this booklet tells quickly and entertainingly the right way to use *right-size* G-E household lamps of every type.

"Alice Looking Through the Glass" should be distributed to every home on your lines. Mail it with statements. Hand it out at your cashier windows. Or, if you sell G-E lamps, give it away at the counter. You can get all you want through your nearby G-E Lamp office at only 2½¢ a copy.



Public demand for G-E bulbs is the highest in history—and *now* there are plenty for everybody—25, 40, 60, 75, 100 and 150 watts. So there's no excuse for bulbsnatching! Why not put "Alice" to work in your Spring home lighting program, and fill empty sockets with right-size G-E bulbs—the lamps that are constantly improved by research to *Stay Brighter Longer!*

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Rockbestos A.V.C. wires and cables are available in many standard constructions in 600 to 5000 volt ratings—single or multi-conductor—with asbestos braid, lead sheath, armor, or lead and armor. Also Type AVA Lighting and Control Wire, Type AVB Switchboard Wires and Multi-Conductor Control Cables. Write for information, recommendations and samples. Address our nearest district office or write direct to:

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Office and Warehouse, 3100-3134 East 10th St., Oakland, Calif.
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- Varnished cambric for high dielectric strength and added moisture resistance.
- An inner wall of heat and flame resistant impregnated asbestos which acts as a baffle between the varnished cambric and hot conductors.
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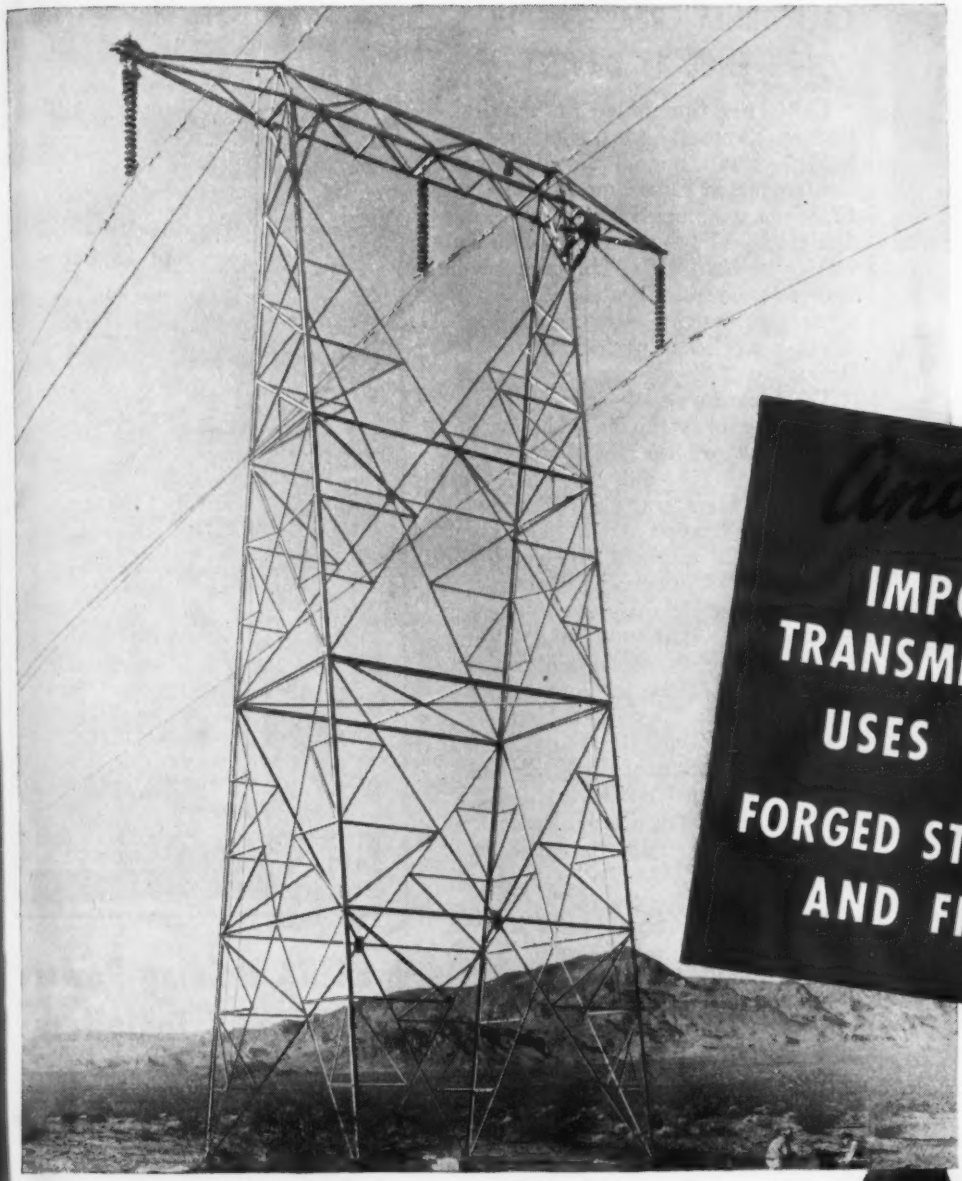
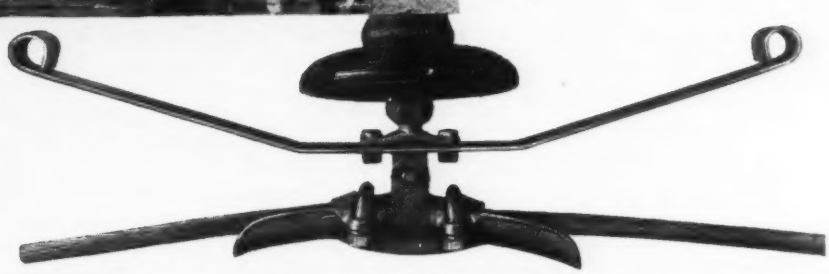


View of tower on Hoover Power House to Chino Substation 220 kv Line.

Another

IMPORTANT TRANSMISSION LINE USES BTC FORGED STEEL CLAMPS AND FITTINGS



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To bring Hoover Dam power to its large distribution area, the Southern California Edison Co. built its Hoover Power House to Chino Substation transmission lines with connecting lines to Capistrano, Laguna Bell, Barre, and Lighthipe substations. The terrain for the major length of the line is rugged. Conductors used are 605,000 cm., 666,000 cm., and 397,500 cm., A.C.S.R. Length and voltage are: 543 miles, 220 kv.; 35 miles, 115 kv. Construction years were 1937, 1939, 1940 with Stone & Webster Engineering Corporation the construction contractor.

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CALIFORNIA CREA SCHEDULES CONFERENCE AT DAVIS

California Committee on the Relation of Electricity to Agriculture will hold its 20th annual Rural Electric Conference in Davis on Feb. 16 and 17, it was announced by Ben D. Moses, Agricultural Engineering division, University of California. This will be the first all-state meeting since the war, when the practice was to hold one meeting in Los Angeles and one at Davis.

The program will include irrigation, dairying, poultry raising and such special subjects as use of infrared lamps for orchard protection against frost and use of high-frequency electric current for sterilization and pasteurization.

Among the speakers will be George A. Rietz, of Schenectady, manager of the rural electric division of General Electric Co., and president of the American Society of Agricultural engineers; H. H. Douglas, Southern California Edison; Charles Sublette, PG and E; O. A. Ghiggoilo, State Department of Agriculture; V. A. Bloxham, Slakey Bros.; Roy Bainer, B. D. Moses, R. R. Parks, Dr. K. B. DeOme, J. B. Dobie, C. N. Johnston and J. S. Golders, all of U.C.

● For the first time in its history, Public Service Co. of Colorado experienced a power failure, Dec. 21, that amounted to more than momentary interruption. The outage, occurring at 10:52 a.m. Sunday, was caused by a main line short circuit (cause unknown) at the company's Valmont plant, near Boulder, and persisted 24 minutes, rendering Denver completely without central system electric light and power for the entire period.

● Pay Increases, averaging $25 a month and ranging to $40, retroactive to Nov. 1, have been approved by office employees of the B. C. Electric Railway Co., at Vancouver. Employees voted 83% in favor of the new schedule, negotiated by the Office Employees' Assn. committee and the company. The schedule, which is to remain in effect until Nov. 1, 1949, is patterned on a survey of community salary levels taken in 20 leading firms.

● Crowded working conditions in the office of the San Diego Gas & Electric Co. have caused the utility to request the Fourth District Court of Appeal to vacate the 4,032 sq. ft. of space it occupies in the company's office building. The court has to the end of this year to find new quarters. It has been in the utility's building for 17 years.

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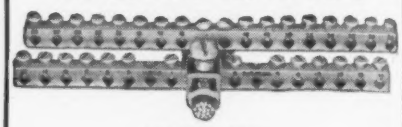

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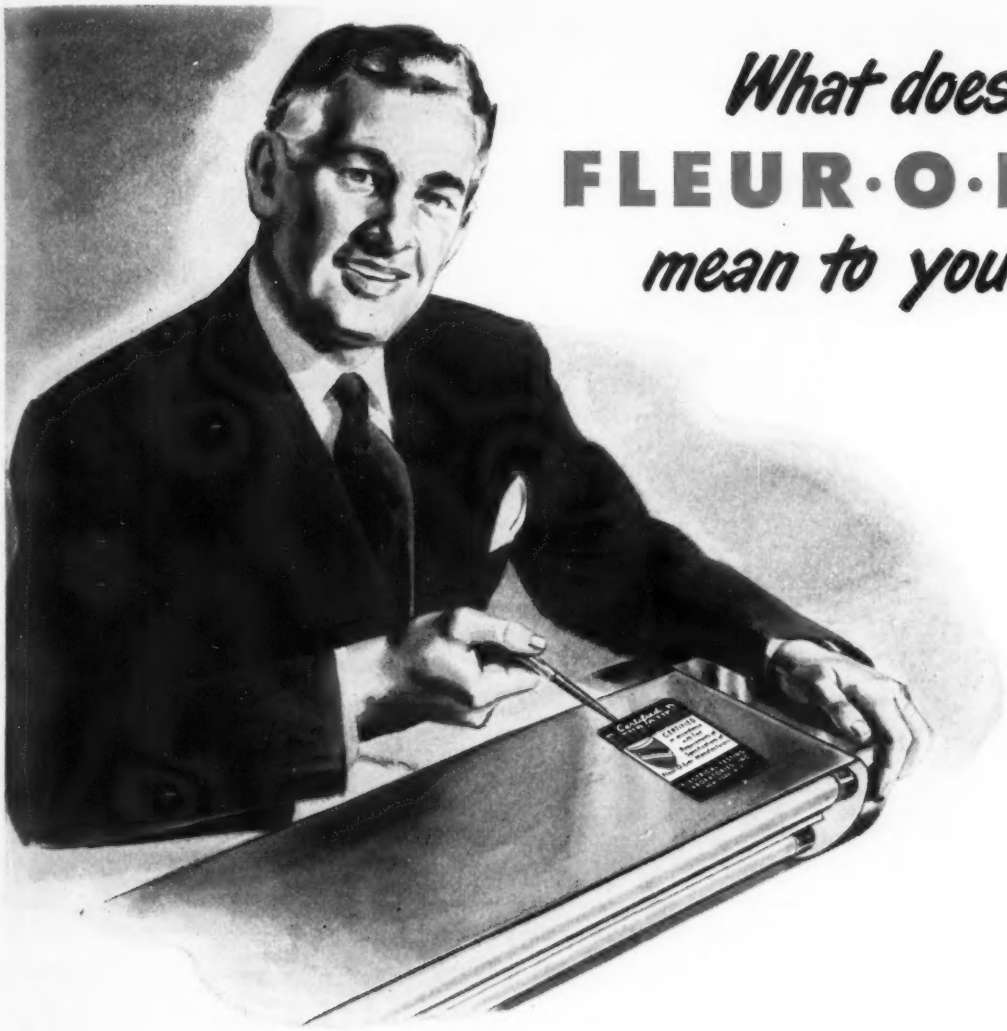

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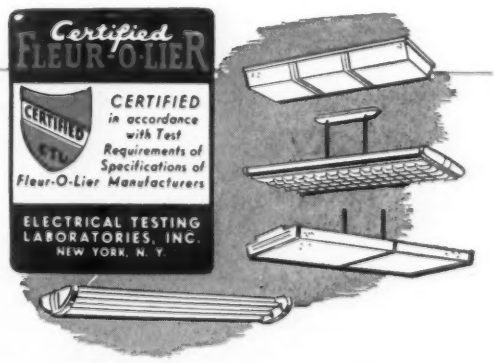
Fleur-O-Lier is both a Product and a Program. Those rigid specifications, the careful checking, enable you to give the product unqualified endorsement. The promotional program develops the commercial fluorescent lighting market—and raises the standards of lighting to higher levels. You benefit—and the customer benefits.



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CITY LIGHT EMPLOYEES ASK WAGE ADJUSTMENT

Raising its original wage increase demand almost 50%, Electrical Workers Union Local B-77 has filed with the Seattle city council a new petition for an immediate salary adjustment for its members employed by City Light.

Repeatedly the union has pressed for negotiations with the council on its salary increase proposal filed Aug. 14, 1947. This asked an over-all increase of $25 per month for all monthly employees, and $1.44 a day for all per-diem employees, effective Jan. 1, 1948. The council has granted conferences, but has taken a stand against negotiations or bargaining. It has deferred action on the salary increases until the union and the private company agree on a scale.

In its recent communication, the union declared "it has now found it necessary to change that portion of our petition dealing with wages" and proposes the following specific increases:

For all monthly employees, $45 a month; for all per-diem employees $2 per day with the exception of linemen and electrical constructors, for whom an increase of $3.60 per day is asked.

Puget Power Workers Will Refer Demands to Board

Ending a two-day strike, 260 "essential" workers of Puget Sound Power & Light Co. returned to work Jan. 16, agreeing to present their demands for higher wages before a three-man fact-finding board to be appointed by the federal mediation and conciliation service. The strikers, including linemen, service men and cable splicers, were members of Local B-77, IBEW; the strike was unauthorized by union officials.

Negotiations involving the 2,250 members of Local B-77 who are employed by the Puget Sound Power & Light Co. have been going on for two months. The union's old contract expired on Dec. 31. The strikers demanded 20 cents an hour above the regular wage scale, asking this advance because they were engaged in a more hazardous occupation. Decision to place the case before the fact-finding board temporarily ended the threat of a company-wide strike.

● THE WALLA WALLA, Wash., city commission has enacted a new electric code setting up a board to examine applicants for licenses. Named to the board are H. V. Noland, electrical contractor; Chester Adams and Phil Guske, journeymen.

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PACIFIC GAS AND ELECTRIC SIGNS WAGE AGREEMENT

Pacific Gas and Electric Co. has signed an agreement with 4,500 members of the CIO Utility Workers Union for a one-year continuation of its present contract, with a provision for an interim 5-cent-an-hour increase, effective from Jan. 1 to March 31. Further negotiations will be made on wage boosts during that time.

Early in December PG and E announced a similar agreement with some 6,000 AFL electrical workers, starting Dec. 1.

The IBEW has asked a 10% increase for its members. The 5-cent jump is equal to approximately 3½% increase. The CIO is demanding an increase of 20 cents across the board.

All of PG and E employees receiving less than $500 a month, whether affiliated with a union or not, benefit by the 5-cent increase.

Court Orders County To Rescind Co-Op Franchise

The board of commissioners of Walla Walla County (Wash.) must rescind a franchise it had granted to the Walla Walla Electric Cooperative for operating along roads and streets in the vicinity of College Place, according to provisions of a judgment filed in Walla Walla superior court.

The state supreme court, in a decision last September, upheld opposition to the franchise in a suit brought by 70 residents of College Place and the Pacific Power & Light Co., which serves the area.

The cooperative is granted the right to make application for a new franchise and has announced it will do so in the near future. The first franchise was granted Dec. 27, 1945, but no construction was carried out.

FPC Asking Companies For Data on Peak Loads

Federal Power Commission has revived its wartime power capacity questionnaires for Class I electric utilities and has asked major companies for new information on emergency steps to meet peak loads.

The commission revised and expanded its monthly Form 12-E statement to include data on changes in system loads, new capacity and generating plant retirements, after lengthy discussions with industry representatives. Utility groups also conferred with FPC during preparation of the supplemental questionnaire covering load reductions, which commission spokesmen said would be sent to the companies only once.

The supplemental statement calls for estimated reductions effected at times of peak loads through (1) voltage reduction, (2) curtailment of service to interruptible customers, (3) voluntary customer curtailment, (4) shifting of loads to off-peak periods, or (5) other methods.

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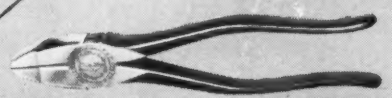

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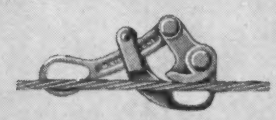

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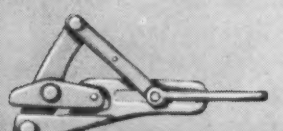

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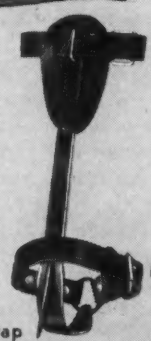

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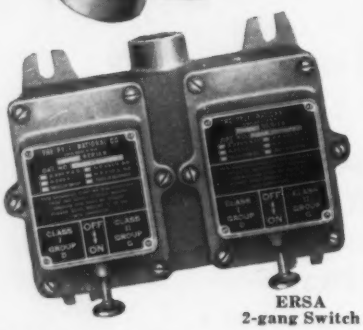

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NEWS ABOUT PEOPLE

● IRVING J. HARRIS recently retired as construction engineer at Shasta Dam after 47 years of electrical engineering work. WILLIAM J. MCCRYSTLE, Harris' chief aide for the past year, has been named acting construction engineer at the dam. Harris entered U. S. Reclamation Service employ in 1909 after nine years of work with southern California power companies to serve as superintendent of construction on the Salt River project in Arizona. In 1916 he went into private consulting practice, returning to bureau work in 1933 on factory inspection of equipment then being manufactured for Hoover Dam power plant. He later was transferred to the dam site, becoming director of power in charge of the dam and power plant. He was transferred to Shasta in 1941.

● JOHN J. MANGAN has been appointed district engineer for the Upper Columbia district of the Bonneville Power Administration, with headquarters in Spokane, succeeding OWEN HURD, who resigned. Mangan has been serving with the Bonneville staff at Portland and formerly was district engineer at Eugene, Ore. He is a graduate of the University of Minnesota and took graduate work there and at the General Electric graduate school.

● WILLIAM H. GORMAN has returned as head of the southern California office of the California Public Utilities Commission. He resigned early in November to become assistant to Ralph Fitzgerald, vice-president of National City Lines. Gorman left the NCL job when he found he would have to move to Chicago. J. G. Hunter, who had been filling Gorman's PUC job in Los Angeles, has returned to San Francisco as assistant director and chief engineer of the commission.

● BRYON T. STORY has resigned as treasurer of the Southern California Edison Co. He was succeeded by PRENTISS C. HALE, formerly assistant treasurer. Story was with the United Electric, Gas & Power Co. when it merged with Edison.

● F. K. MCCUNE, former Westerner, has been named assistant to the general manager of General Electric's apparatus department.

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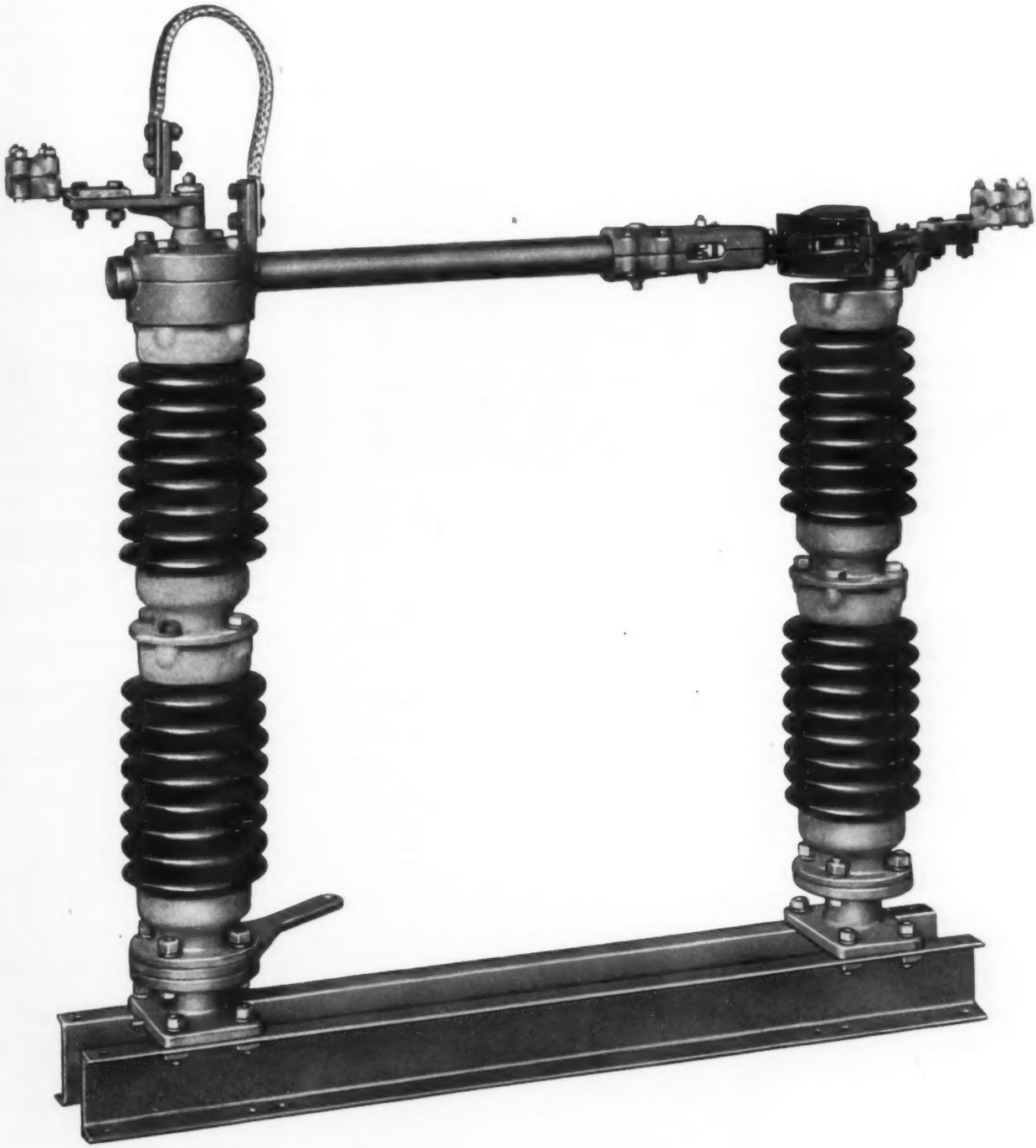

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● EARL MOSLEY, former Colorado Springs city manager, has been appointed to the newly created Denver muncipal position of utilities director. Responsibilities of the incumbent will involve advising city council, which controls utility affairs, on rate-making and franchise matters. His salary has been set at $8,000 annually—an item included in the city's budget for the first time. Since his resignation from the Colorado Springs post, which he had held for many years, Mosley had been acting as temporary executive director of the new state industrial and resources promotion department.

● PAUL J. RAVER, Bonneville Power administrator, has announced the resignation of IVAN BLOCH, former chief of the division of industrial and resources development of the Bonneville Power Administration and for the past six months industrial consultant to the Department of the Interior's Pacific Northwest Coordination Committee. Bloch will enter private practice as an industrial engineering consultant with headquarters in Portland.

● REAPPOINTMENT of Eugene R. Hoffman as Seattle City Light superintendent has been confirmed unanimously by the city council. The new appointment is for four years at $12,500 annually, a $2,500 annual salary boost which makes him the city's highest-paid official. Hoffman has held the position since 1939.

● GEORGE R. MILFORD has retired as Shasta division manager of Pacific Gas and Electric Co. after 44 years of service with the company. He will be succeeded by THOMAS B. COPELAND of Red Bluff, Calif. Milford has been the company's Shasta division manager since 1920.

● JOHN F. RYAN, employee of the Graybar Electric Co. and its predecessor, the supply department of Western Electric Co. at Portland, for more than 40 years, retired the first of this year. He had been active in the electrical industry for 50 years.

● APPOINTMENT of EMMETT M. GOODBAR as division superintendent, maintenance, at the Pittsburg, Calif., plant of Columbia Steel Co., was announced by J. D. McCall, general superintendent at Pittsburg.

● BUREAU OF RECLAMATION has appointed HAROLD E. WARREN of Seattle as district safety engineer for the Columbia Basin project. He fills the vacancy created by transfer of CHARLES C. PARSONS to Billings, Mont.

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● APPOINTMENT of RALPH WINSHIP as manager of sales for the Washington division of Columbia Steel Co., was announced by M. H. Freedman, division manager of the U. S. Steel subsidiary. The Washington division offices are located at 1331 Third Ave. Bldg., Seattle. Further announcements from the company include the appointment of B. W. MITCHELL as manager of sales for the Oregon division, with offices at 2345 Northwest Nicolai St., Portland, and ANDREW CARRIGAN as manager of sales for the central division, with offices in the Russ Bldg., San Francisco.

● MARSHALL WELLS has been appointed general sales manager of Sues, Young & Brown Inc. Wells formerly served as assistant general sales manager and major appliance division manager for the company. EDWARD J. DYMEK will be the new manager in charge of major appliances.

● ORMONDE SMITH JR. has been appointed to the sales and service staff of C. C. Musgrove, sales representative for the Pacific Electric Mfg. Corp. of San Francisco. Smith will handle sales and service from the new Houston headquarters.

● MILTON FRENCH has been appointed resident district manager in Fresno, for the Schuyler-Wilson Co., San Francisco. He was formerly in the appliance business with Buford's, Fresno.

● WILL H. FISHER, vice-president of the Southern California Edison Co., retired recently after 25 years with the company. He came to the Southern California Edison Co. in 1922 and nine years later became its vice-president.

● A. G. KIESER, head of the treasury department of the California Electric Power Co., retired recently after 27 years of service with the company. His successor is LEON S. HESEMAN, former assistant treasurer who has been with the company for 31 years.

● CARL K. NICKELL, for the past two years sales manager of the J. N. Ceazan Co., Crosley distributors in San Diego, has been promoted to vice-president in charge of sales for the H. M. Tower Corp., Crosley distributors for Connecticut.

● PETE PEARSON, formerly with Simpson, Lord and Pearson, has rejoined the sales staff of the Canadian Westinghouse Co. in Vancouver, B. C.

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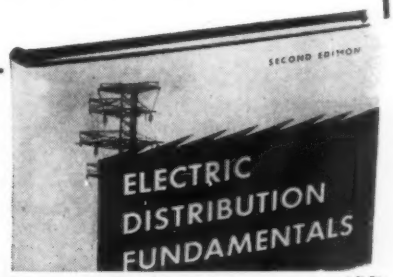

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Deaths

● A. EMORY WISHON, 65, executive vice-president and until his semi-retirement last July, general manager, Pacific Gas and Electric Co., died of a heart attack at his country home, Danville, near Oakland, Jan. 4. Born in St. James, Mo., he graduated from Missouri School of Mines & Metallurgy in 1908 and came west with his father, A. G. Wishon, who pioneered the San Joaquin Light & Power Co. and introduced electric pumping to California agriculture. Emory Wishon organized the Coalinga Water & Electric Co. in 1909, pioneered electric operation of the oil industry, became assistant general manager of the San Joaquin Light & Power Co. in 1910. When the latter was merged with Great Western, and both with PG and E, he went up in management. He was also active in development of California industries. When president of the PCEA he enunciated the "intelligent self interest" doctrine of industry cooperation and coordination and fostered its practical application throughout his career.

● PHILIP SHERIDAN BIEGLER, 68, former dean of the college of engineering at University of Southern California, died of a heart attack in Los Angeles, Jan. 13. He was dean of engineering at the Los Angeles university from 1928 until 1940, when he was appointed head of the department of electrical engineering. He held degrees from the Universities of Wisconsin and Illinois and had taught at Iowa, Purdue, Montana, Illinois and Washington State, joining USC in 1923. Biegler also was credited with helping design the first steam turbine in the United States, while he was with the Chicago Edison Co. He was a fellow of AIEE, Los Angeles Chapter, which recently honored him at a banquet commemorating his 42 years in the electrical industry.

● GEORGE MILES died Nov. 23 at San Mateo, Calif. He had been associated with Westinghouse since 1901, retiring in 1946. He worked for the company in Seattle for many years serving successively as manager of the insulation department, supply division, central station section, and lastly as central station engineer.

● HERBERT J. MAYO, 54, died on Jan. 1. Mr. Mayo was in charge of sales in the southern California territory for Smoot-Holman Co.

● F. C. MCLAUGHLIN, executive assistant for the Southern California Edison Co., died on Jan. 15. He had been with the company since 1910.

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NOTES ON THE TRADE

Pacific Electric Motor Honors Veterans

A dinner to the third group of employees who have been with the Pacific Electric Motor Co., Oakland industrial electrical contracting and motor firm, was given recently by the management. Honored were Gustave Larson, Walter Deward and John Merriman. Walter Vance Jr., son of one of the founders, presided.

Frank Boyd, president and the other original partner, discussed the company's future frankly with the group. Within a year and a half, he said, the city would take over present property for an enlarged civic center. Pacific Electric Motor Co. in anticipation of this has bought two acres at 66th Ave. where it will erect a 30,000 sq. ft. building. Boyd invited suggestions as to its layout and equipment from all.

Grown from a $125,000 annual business 25 years ago to $1,500,000 in 1947, Boyd explained the percentages going to materials, labor, salaries of staff, overhead, taxes and profit. He said he foresaw an active market ahead, but a more competitive one.

● A. B. CHANCE CO., Centralia Mo., has set up boundary lines for the handling of orders for its Western customers. The eleven Western States will be serviced from the San Francisco plant. At the company's recent sales conference held in Missouri, representatives from the West Coast included: J. T. Isbell, vice-president and Pacific Coast manager; and Western representatives, E. G. Ryman, Portland; J. S. Curtright, Los Angeles; M. R. Parkin, Salt Lake City; Donald Creim, Sam Small, and Louis Rockholt, all of San Francisco.

● WESTERN ELECTRIC SUPPLY CO., Spokane, has announced that it will occupy a new warehouse at Monroe and Gardner St., Spokane, to be built by the Union Pacific Railway. The building will be of concrete construction providing floor space of 30,000 sq. ft. The estimated cost is $175,000.

● CRESCENT ELECTRIC SUPPLY CO., San Francisco wholesale distributor, has opened a branch office and warehouse at 722 Tupper St., Santa Rosa, Calif. under the management of John Guth.

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THE Manufacturers' Directory published each April by ELECTRICAL WEST is used throughout the year by the buyers of electrical equipment in this market. This is the only Directory listing Western offices and sales representatives of electrical manufacturers. The 16th Annual Directory will be published in convenient handy form as Part II of the April 1948 issue of ELECTRICAL WEST.

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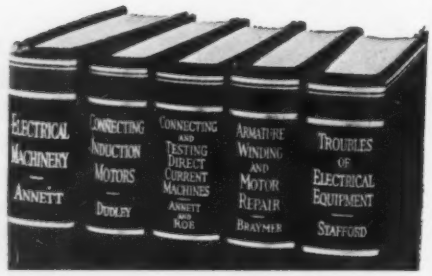
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● WEST COAST REPRESENTATIVES who attended the annual sales conference of the James R. Kearney Corp., St. Louis, include; Harry Hartzell, Dean Cady, Dave Hatton, Fred Mulvany and Ed Reichwein, all from Maydwell and Hartzell, West Coast distributor for the James R. Kearney Corp.

● PENNSYLANIA transformers will be sold in northern and central California in the future by the George E. Honn Co. This results from an arrangement with J. G. Corrin of Los Angeles, California agent for the Pennsylvania Transformer Co.

● JAY TAGG has been assigned to the Seattle sales office of National Electric Products Corp., Pittsburgh, Pa., to assist N. L. Bost, who represents the company in the Northwest. They will make their headquarters at 1049 Sixth Ave. S., Seattle.

● LEE ARTER CO., manufacturers' representatives in Los Angeles, has appointed John G. Rowe as its Pacific Northwest sales manager. He will headquarter in the company's Seattle office.

● JAMES D. LAND, district manager, Zinsco Electrical Products, has announced the opening of a new branch factory and sales office at 1841 Adeline St., Oakland, which will be northern California headquarters.

● EASY WASHING MACHINE CO. has appointed Jack C. West district sales manager for the Seattle area of the company's West Coast division.

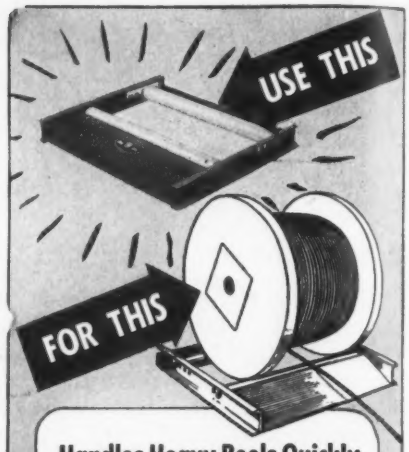
● JOSEPH C. PLATT INC., Pacific Northwest manufacturers' representative, is representing the Southern States Equipment Corp. products in the Northwest territory.

● WILDERMAN DISTRIBUTING CO., Seattle, has been appointed a distributor for Iceberg Refrigerated Locker Systems on the West Coast.

● JOHN R. CONRAD, vice-president and general manager of S & C Electric Co., recently made a trip to the West Coast.

● L. M. KERKHOF has been named district sales manager in northern California for the Trumbull Electric Mfg. Co.

● SHARP ELECTRIC CO. has announced opening of its expanded and remodeled store at 128 S. State St., Salt Lake City.



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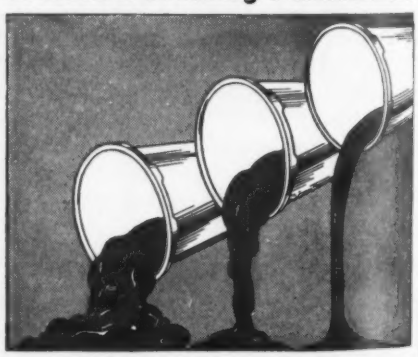

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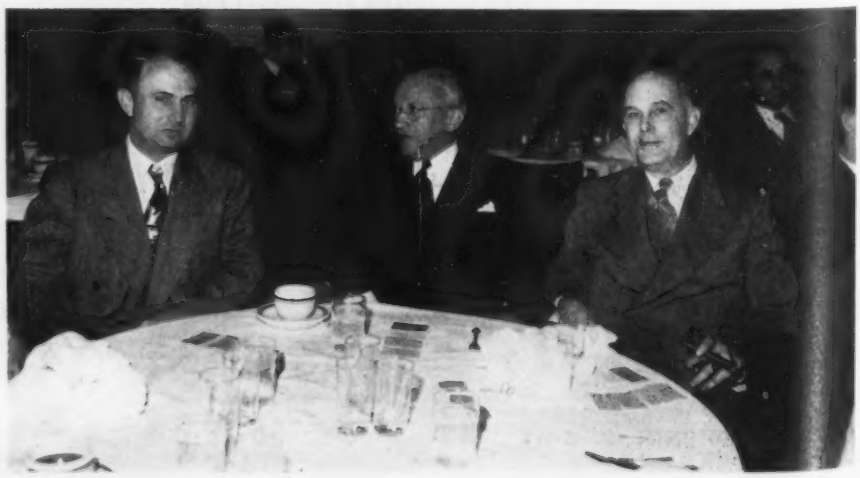
PROFILES

Recently promoted in the Utah Power & Light Co. organization were James C. Littlefield, above left, now manager of the Salt Lake division; O. H. Ririe, above right, new Ogden division manager; O. M. Slack, right, moved to American Fork, southern division head

Below: George O. Elmore, Southern California Edison, right, receives $250 second prize in Pennsylvania Transformer Co. name contest from John G. Corrin, sales rep. for the manufacturer

Below: Magnet wire sales manager, J. P. Davis, of Anaconda Wire & Cable, Chicago, and G. M. Eickmeyer, vice-president of Tri-State Supply Corp., Los Angeles, were visitors to a recent Electric Club of Washington, Seattle, meeting with R. C. Cairns, district manager of Tri-State, and L. M. Wolfe, Anaconda representative. The latter was cut off by camera, at extreme right



Jobs...

—IN A SACK OF CEMENT

—IN A TON OF STEEL

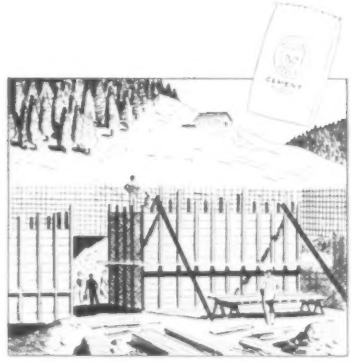
—IN A MILE OF WIRE

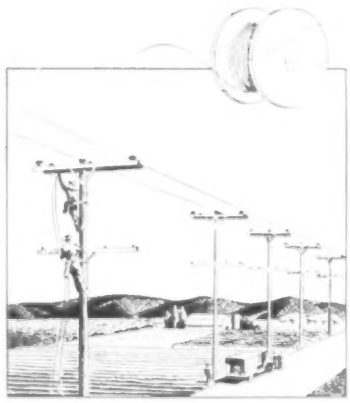
1947 was a busy year of work and accomplishment for this company. Thousands of tons of cement, steel and wire have been set in place by labor in the field on scores of gas and electric projects throughout Northern and Central California.

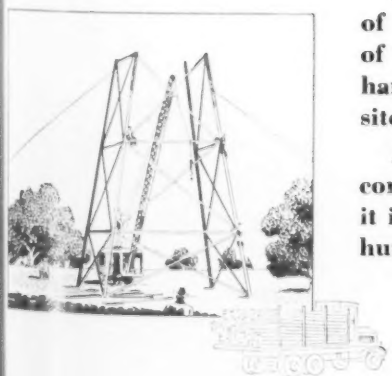
Great construction projects, such as this company's $350,000,000 expansion program, beget jobs and spread millions of dollars through many payrolls. More than 1575 new employees were signed on with the P. G. and E. during the past year, while in the two-year period from August 1945 to October 1947 the company's payroll increased by 5845 employees. Private contractors working on P. G. and E. construction have an additional 2340 men in monthly average employment.

And beyond that are jobs in every sack of cement, every ton of steel and every mile of wire that was made or fabricated and handled and stored and unloaded at the job sites.

All of this construction money becomes constructive dollars of local wealth because it is made on the job and paid on the job in hundreds of communities in this area.



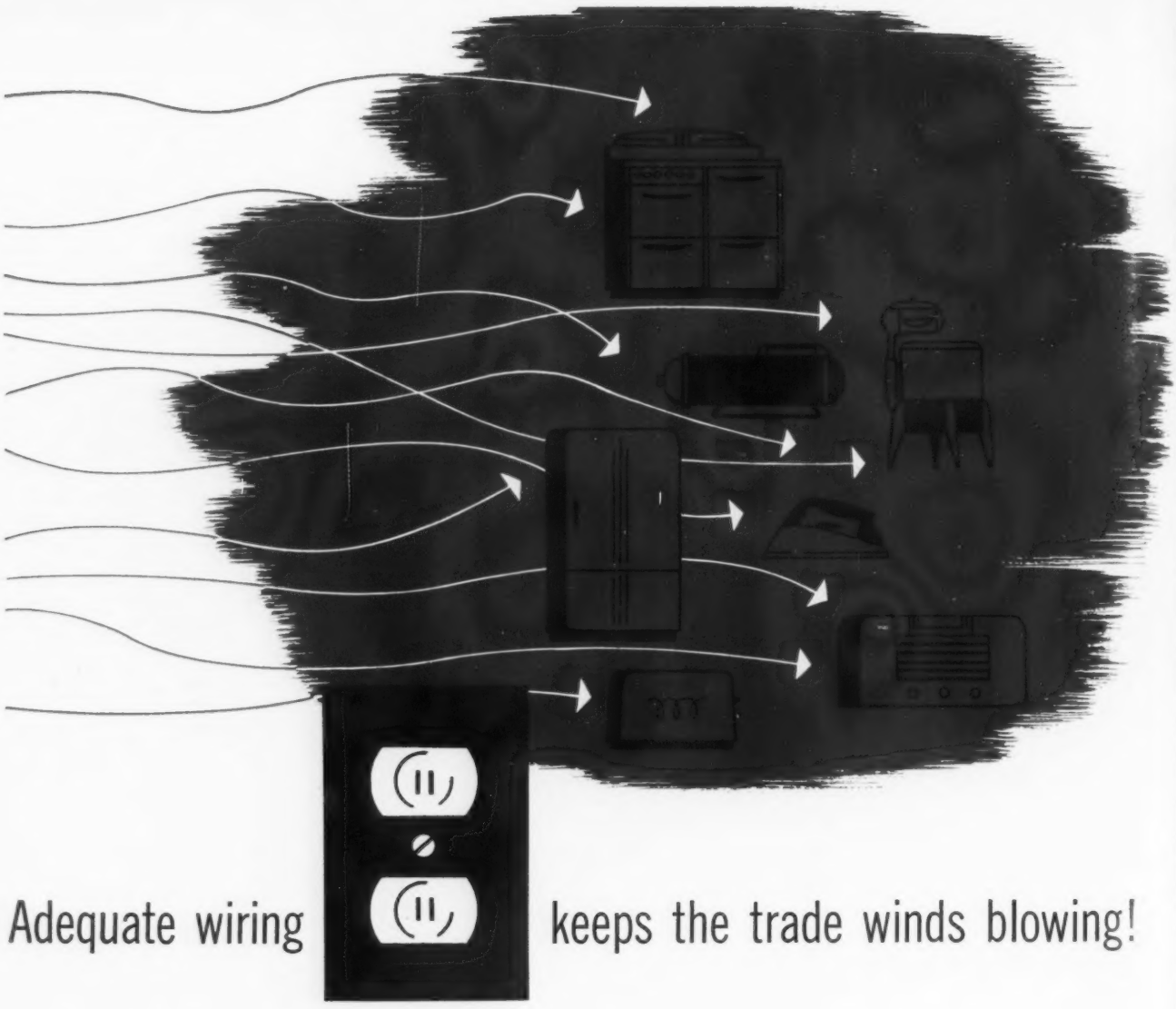




P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

EW 2X-248



Adequate wiring keeps the trade winds blowing!

Your appliance market will have wider horizons, and your sales will be better if homes are adequately wired. Performance depends on quality, yes—but not on quality alone. Satisfactory performance from a sweeper, an iron, a toaster, a range, a radio or a refrigerator comes easier and stays longer in the house that is wired to deliver full power at every outlet.

Any appliance, no matter how fine, will operate more efficiently where it is not starved for electricity because of too small wires, or too few circuits, outlets or switches. So adequate wiring is an extra push to keep your appliance sales moving—today, tomorrow, and the day after that!

PACIFIC COAST ELECTRICAL ASSOCIATION

601 West Fifth Street, Los Angeles 13, Calif. 447 Sutter Street, San Francisco 8, Calif.